EDP industry report and market review

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" ANNUAL INDEX • VOLUME 8 P.J. McGOVERN, PUBLISHER

ANNUAL INDEX

November 27, 1972 to October 11, 1973

Previous **EDP/IR** indexes;
Volume 1 – March 23, 1964 to January 15, 1966
Volume 2 – March 15, 1966 to June 15, 1967
Volume 3 – June 28, 1967 to July 24, 1968
Volume 4 – July 31, 1968 to August 29, 1969
Volume 5 – September 11, 1969 to December 9, 1970
Volume 6 – December 15, 1970 to October 19, 1971
Volume 7 – November 12, 1971 to November 6, 1972

VOLUME 8 HIGHLIGHTS

Issue No.	Date	Major Topics
1	11/27/72	Cable TV industry; IFIP General Assembly
2	11/30/72	Minicomputer industry; Supreme Court software ruling
3	12/7/72	IBM 360/370 migration; census 10/1/72
4	12/19/72	FJCC; Inforex; Herb Grosch
5	12/29/72	1972 shipments; Hewlett-Packard; IBM vs. USA
6	1/19/73	CDC/IBM suit settlement; computer services
7	2/2/73	IBM large data bases; HIS, Univac products
8	2/19/73	IBM 3740 data entry system; floppy disk technology
9	3/7/73	IBM leases; turnkey systems
10	3/19/73	IBM 370/115; Winchester disk file; Burroughs B700
11	3/30/73	REVIEW AND FORECAST
12	4/12/73	Minicomputer manufacturers; microprogramming
13	4/27/73	Management attitude survey
14	5/11/73	IBM four-year lease survey
15	5/31/73	Terminals market
16	6/22/73	Telex/IBM trial
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20	8/30/73	EFTS
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22	9/24/73	IBM loses to Telex
23	9/28/73	Customer loyalty survey
24	10/11/73	ADAPSO annual survey; computers in federal government; change in Telex ruling

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"THE GRAY SHEET" NOVEMBER 27,1972 • VOL.8,NO.1 P.J.McGOVERN,EDITOR

WITH THE TECHNOLOGY ALL SET, TWO-WAY CABLE TELEVISION NETWORKS MEAN ALTERNATIVE LOCAL DISTRIBUTION FOR EDP SERVICES OR DATA COMMUNICATIONS

Imagine, sometime around 1984, sitting at a computer terminal in your home some evening, playing bingo with a computer and 100,000 other people in your community. Or imagine your children using the same terminal to do homework assignments -- with the computer (not you) tutoring the latest version of the "new math." Later, you and your spouse could use the terminal in conjunction with your color TV screen to do your Christmas shopping via catalog. And, naturally, the same setup would provide you with first-run movies, on command, and without commercials, for a small fee.

For some time now, observers of the cable television (CATV) industry have been painting scenarios like the one above. Supposedly, the cable of today, which usually does little more than pump off-the-air signals into homes where reception is poor, will be the "wired city" of the future, offering entertainment features impossible with the current economics of broadcasting, plus education in the home and computer appliances at least as useful as the dishwasher.

The distance between that view and what is, is considerable. Nevertheless, it is clear already that computer - CATV interfaces will be central in bridging the gap. We're going to take a look at what's emerging -- a potential "retail distribution network" for the computer service industry and an alternative local communications system for EDP users.

Cable TV - Today

CATV has already become part of the communications industry. At present some 2883 systems serve 6.6 million subscribers, or about 11% of the homes in the United States. Revenues from subscription fees amounted to $375 million last year.

Entertainment services sell the cable now. All systems offer ghost-free color reception of all local and perhaps a few distant signals (relayed by microwave to the master CATV antenna). But other characteristics vary. Typical systems offer 12 channels of programming -- because more signals would raise interference problems and require set-top channel converters. A few older systems have five or fewer channels, while the FCC currently requires 20 channel capacity for new systems.

In addition, many cable operators produce programs of their own. Manhattan

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systems have carried the Metropolitan Opera and sports events at Madison Square Garden. A more typical operation in Woburn, Mass., presents 10 hours a week of local news, city council meetings, and high school sports. Moreover, recent FCC rules require the cable operator to originate programming. He must also free a channel for public access and turn over channels to governmental and educational uses. Hardly required by the FCC, but in this same category, are recent pay-TV via-cable arrangements.

The cost of wiring and retrofitting CATV systems is a major expense. "Retrofitting" or rewiring, has been made necessary by the FCC. Not only are 20-channel systems required, but all systems will have to have the capacity to carry a digital signal back to the "head end", i.e. where the wires originate, by 1977. And cable marketers are trying to turn this rule into an asset -- by designing profitable services that employ the two-way capacity. It's here that computers will hook onto the cable.

CATV will begin -- in the next 18 months -- employing computers for three general reasons: "one-way" service, e.g. billing for pay-TV; "passive two-way"; such as reading utility meters; and interactive two-way service; initially shopping-in-the-home. These classes approximate what's state-of-the-market now, what phase "next" will be, and the outlines for phase-after-next.

One-way Service

The icebreaker for the computer-cable relationship is subscription television. The advantages of this approach are numerous:

- Market research on potential pay-TV services has yielded positive results; moreover, the "software" is ready made -- 1st run movies, rock concerts, sports events. CATV managers don't have to be sold on the idea.

- The dearth of two-way capability is no roadblock. Until the capacity is built-in, the telephone provides the "upstream" channel, for data return to the computer utilizing touch-tone pads or accoustic couplers.

- The computer can schedule programs flexibly enough to offer a wide variety of programming, with only a few channels having a limited number of offerings at any one time. There are systems that can offer three titles a day, five titles a week, with no more than 40 minutes to wait for a film to start anytime from 4:20-11:40 p.m.

The movie concept is operating in motels at the present; applying it to CATV systems amounts to merely scaling up operations. Home Theatre Network will launch full scale operation in three cities after the first of the year, using first run movies and live programming, with computer distribution and billing, and telephoned requests.

This service can be the foot in the door for computers in the CATV industry. Moreover, with computers in place, a whole range of other services can be provided once the two-way digital capacity is wired in.

Two-way service - Phase One

A number of two-way applications of CATV requiring computer power are moving

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A SHORT HISTORY OF "THE WIRED NATION"

CATV was born in the hills of Pennsylvania and Oregon back in 1948. The first systems usually carried five or fewer signals and were often owned by the local television-radio store as a device to boost sales. Until 1962, cable was a rural phenomenon -- the FCC took scant notice of its existence, though Congress made an ill-fated attempt to regulate it out of existence in 1959 under pressure from local broadcasters.

During this time, the FCC had refused to regulate the cable, since to them it was essentially a closed-circuit television operation. But in 1962 under the Democratic administration, the Commission reversed its earlier decision and decided to regulate. At first, the rules applied only to cable systems that used microwave relays. As the courts continued to uphold the FCC's exertion of authority, their moves became bolder.

Finally, in 1966, the Commission announced that it had full authority to regulate all cable systems. At the same time, it froze the development of the industry by prohibiting the use of signals from outside the local market in the 100 top markets in the country, which constitute 90% of the total television market.

Two years later, the Supreme Court apparently settled the issue by affirming the FCC's decision. But shortly afterward the Court threw the matter back into limbo by deciding that CATV's reproduction of broadcast signals was not an infringement of copyright -- most observers had hoped that copyright enforcement would provide a means of self-regulation of cable.

As a consequence of the Court's action, broadcaster fear of cable expansion, Justice Department fear of collusion between cable operators and broadcasters, executive influence from the Office of Telecommunications Policy, and Congressional pressure, not to mention uncertainty about the overall impact of the cable technology, the industry freeze lasted until March of 1972. The rules that emerged appeared to most observers as a compromise package that would allow cable (in its present one-way guise) to penetrate the second fifty markets, while the as yet untested origination and two-way functions of the cable are put to trial.

After six years of bruising battle, the FCC is currently taking a wait-and-see attitude toward the future. Their big problem now is handling the backlog of certification applications that accumulated during the freeze.

from the feasibility study stage to marketing tests. Characteristically, these systems have more to offer the cable system operator than the consumer, apparently because of the relatively high cost of terminals. But they are a quantum leap beyond pumping programs down the pipe.

One system, the Tocom II, developed by Tocom Inc. of Dallas, will shortly be operable in a suburb of Dallas. The system consists of a central data terminal for $100,000, including a basic computer of 16K bytes core memory, mag tape storage, and display consoles. This can handle 2,000 customers initially, up to 60,000 by expanding the CPU to 64K bytes of memory. The home terminal costs $150, including a 26 channel expanded band converter, and a transmitter for inputs from peripheral

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systems (see below) and a 5 button keyboard. The CPU and terminals are connected of course, by the two-way cable.

The system is initially programmed to handle a wide range of services:

- Distribution and billing for pay-TV channels.
- "Peripheral systems" which automatically reads gas, water, and electric meters; also alarm systems for fire, burglary, and emergency calls.
- Monitoring system performance controlling amplifier gain, and checking peripheral systems every six seconds, as well as furnishing instant, total ratings data to the system operator.
- Subscriber billing.

Similar systems are in various stages of testing and/or feasibility study. For instance TelePrompter, the industry giant, has a system in El Segundo, California using equipment built by the Theta-Com subsidiary of Hughes Tool. The operation is still only in the shakedown stage with 25 terminals in place.

Similarly, Orange Cablevision of Orlando, a system owned by American Television Communication of Denver, is co-sponsoring an experiment with EIE, an RCA subsidiary. The venture will test a Tocom-like operation after the first of the year.

Unfortunately, what these systems have in common is that they don't fit the idea of a computer utility very well. The services aren't really that ambitious. The cost of terminals is one factor holding things up, but it's also the fact that the CATV industry is not rushing into marriage of computers. Why? There seems to be several reasons: (1) The decision makers in the industry like to think of themselves in the entertainment business - because they know it sells and because most just aren't conversant with, say, the concept of a computer service bureau. (2) Wiring a city is a highly capital intense venture. Thus most CATV sets are burdened with a good deal of debt. Consequently the system doesn't have the money to spend on developing services of their own. (3) The industry is in a state of consolidation. A lot of people are just sitting tight to see where things are going . . . small and large operators alike.

The CATV Computer Utility - Phase Next?

The ground breaking for interactive two-way cable services is imminent. Even the terminals in the Tocom system employ a minikeyboard for opinion polling and home shopping. A system in Overland Park, Kansas uses a voice-grade return signal (a unique feature) to bring home-bound students into the classroom. Bigger experiments are in the works.

Jonathan, Minnesota is the site of a currently operating market test of cable services. Jonathan is a new town outside of Minneapolis, built like Reston, Virginia, from scratch. No terminals are currently in the home -- instead, the system operates between a hospital some fourteen miles away and a clinic in town, as an example of the institutional possibilities of CATV application. Other terminals in the schools offer a number of interactive instructions programs. The idea is to give students a chance to become familiar with the equipment before the home service is marketed to their parents. Similarly, a number of demonstration terminals in the village center stimulate home shopping and alarm systems.

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LOCAL REGULATION -- A Potential Snarl

Because CATV has to put its wires on city property, the local regulation and franchising of cable is a major focus of concern. Unlike broadcasters (and unlike computer service bureaus) cable will have to deal with situations all too familiar to the telephone company. Therein lies several dangers for CATV and for the public.

The courts have ruled that state and local bodies have the power to regulate cable franchising requirements in any area that the FCC has not covered in its own rules. Because the Commission did not have the resources to monitor cable development very closely, it left wide latitude to the states. Most states have left the matter in the hands of the local franchising authority. About half a dozen states vested franchising power in their Public Utilities Commission, which usually regulates the power companies and the telephone system. In two states, the local body franchises the the cable system, but a state board has some degree of oversight.

Since the development of computer appliances via CATV will largely be the result of who owns the wires and what they are allowed to do with them, the shape of local regulation of cable may determine the future of this market. Yet most local officials know little more about cable than its vast potential profitability. Two extremes will have to be avoided by educating and watching the state and city regulators; (1) a stringent rate-of-return limitation that could dry up capital for system development (2) loose local control leading to management content with the status quo.

However, plans for the home terminals are among the most ambitious of any program in the country. The system will offer:

- General information, for instance the floor plans of all the homes in the new town,
- Education programs with multiple-choice response to questions.
- Fire, burglar alarm systems and automatic meter-reading.
- Interactive games with the computer or with other subscribers.
- Opinion polling and similar services.

Evidently Jonathan's Community Information Systems has tested the potential demand for such services, although they are reluctant to indicate precisely what they hope to find. The unique aspect of the Jonathan experiment is that it puts interactive computer/data bank services in the first phase of home operation after tests in the schools and other institutions. Other tests tend to put the interactive tests in the "phase after next" or "eventually" category.

Still, the Jonathan strategy is essentially sound, and has the support to carry it out. Education seems to be the foot in the door for cable/computer appliances in the home. In totally wired new towns, the student sector is a captive audience. The educational system can be employed to familiarize families with the concept and a few of the possibilities. Once the ground has been broken, the other applications can follow.

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Another, even more promising route to a computer-cable interface depends on business. Data communications carriers such as Microwave Communications are looking for a local "drop" for their common carrier microwave networks. The cable offers certain advantages over the other two candidates for this service, the telephone lines and microwave links.

- The cable is a better "pipe" than the twisted wire pair for carrying voluminous amounts of digital data. And the telephone companies are not encouraging the data carriers to use their lines for local loops.

- The possibility of microwave crowding in major urban centers limits its widespread growth. Besides, microwave transmitting/receiving facilities are expensive.

The major factor hampering the growth of this interface is the absence of cables. For example, MCI's microwave link between Chicago and St. Louis connects two cities nearly bereft of CATV. However, in contrast to educational applications of interactive cable, there is a ready-made demand for this service right now. Thus it could encourage the business community to get on the CATV bandwagon -- and accelerate its entrance into the top markets.

A second advantage of the business route is that it will promote an open structure for the industry as a whole. If companies like MCI begin to lease bands on the cable for their own uses, the computer utility is not far behind. Then small computer service bureaus could grow in cable markets, possibly even providing the home services that are discussed above. Unlike the present experiments, these bureaus would not depend on the cable owner for capital, so they would be more flexible in designing and test marketing new services. The effect on the development of the home computer appliance would undoubtedly be significant.

What next?

At this point, two-way cable is still in germination. There is no doubt, however, that this will change. Within the next five years two-way cable is bound to take off, barring precipitous action from any of a number of sectors. Two issues pretty clearly will dominate -- one dealing with industry structure, the other with personal implications of the new technology.

Cable as a common carrier. From its inception, the resemblances between CATV and the telephone system have been noted. The arguments to this effect have increased in recent years as community groups, entrepreneurs, civil libertairians, and others have decried the potential for information monopoly that the cable operator holds. In the interest of breaking up this monopoly, these groups have called for the separation of the programming and distribution systems of CATV.

There's a practical reason for such a move, too, because it would spread around the risk of offering two-way services. The CATV operator cannot be all things to all men. Even the largest multisystem operator can't afford to get into the pay-TV business, the alarm system business, and the computer service bureau business all at once. Yet this is what is asked of the operator. The March FCC rules allowed CATV systems to lease their spare channels in an attempt to see what would come of common carrier status for cable. And it is not hard to see that systems like TOCOM could be owned and operated by a separate firm while using the cables for hire. As noted earlier, the "new carriers" such as

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MCI, or small computer service bureaus, could employ the cable's capacity without owning it, to the advantage of the cable operator, the service, and the customer.

The question of privacy. There have been minor rumblings about the surveillance potential of two-way cable. Most cable operators do not see the problem as a serious threat. Nevertheless, it points up the need for public education about the possibilities of CATV for such applications and its limitations. In addition, safeguards against unwarranted intrusion should be prominently featured in the demonstration systems.

Because CATV promises to be the first home computer appliance, it will have to bear the brunt of educating the public about computers and their uses. There is a strong motivation for their facing the question now. Cable television was hurt by the "save free TV" movement of a few years ago, and the surveillance question has the clear potential of producing a similar anti-cable campaign which could be permanently damaging.

In Summary

The history of CATV has seen group after group developing an interest in CATV -- to the chagrin of the cable operators who just want to provide their service and make their profits. The FCC rules of last March have finally given them a reason to look for partners. The signal limitation imposed by the Commission will exclude CATV from the major markets unless new services are developed. Although most of the experiments are modest in aspiration, the field is wide open for third-party tests. The lack of reliable market data does not indicate the lack of a market.

But there are cautions to be made. The patchwork of cable regulation and the groups that are opposed to cable development for economic reasons are liable to limit its growth. Education of the public, and an understanding of the forces involved will be necessary to foster the growth of the two-way wire.

At IFIP General Assembly

FRENCH COMPLAIN OF AMERICAN DOMINATION OF COMPUTER MARKET, CALL FOR EUROPEAN "UNITED FRONT" AND FOCUS ON DOMESTIC MARKETS AS KEY TO SURVIVAL.

Western European computer firms are becoming increasingly restive about the American (read IBM) control of the world computer market share. For support in fighting the onslaught, the companies are turning to their governments for subsidies and equipment orders and to each other for shared product development and marketing costs. The ultimate result of this policy was outlined at the IFIP General Assembly Meeting in Sophia, Bulgaria, last month.

Attending a technical session on the state of the industry in the U.S., the Soviet Union, and Japan, and Western Europe was Maurice Allegre, Delegate of Information in the French Government. He has long advocated a unified European computer industry and was instrumental in appropriating about $130 million to the French computer manufacturer CII over the last four years through Plan Calcul.

Monsieur Allegre based his claim on American dominance by pointing out that 56% of the world computer business goes to IBM, while another 28% belongs to other U.S.-headquartered firms. Half of the American business represents non-U.S. marketing. Firms outside the U.S., on the other hand, make virtually no ship-

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ments to the U.S., and achieve only 16% of the world market, of which over half belongs to Japan, he said.

European countries have recognized the strategic position of a viable domestic computer industry. Monsieur Allegre cited subsidies approaching $1 billion and preferential treatment to the local supplier in the United Kingdom, Germany, and France. But these efforts have not assured the survival of the domestic industry. Each of the firms involved are too small to hope for self-sustaining profitability in the long run, he concluded.

Instead, European computer companies should bind together to advance the cause of European computer technology and capability. Mons. Allegre did not forsee a formal merger in the near future. However, within three to five years, the companies could be combined into a multi-national corporation with substantially decentralized leadership and decision making. Each member would try to achieve a respectable share of his domestic market, and whatever foreign business it could achieve.

One of the major reasons for the focus on the domestic product is the dependence of European companies on government for markets. Mons. Allegre noted that 40% of the computer market in France represents government agencies or nationalized industries such as transportation and communications systems. This assured based of support broadened by standardized EDP procedures in other European governments will provide the key market where procurement policies can be aimed at "buy national."

In Japan, the emphasis is also on consolidation, K. Nakahara, general manager of the System Laboratory of Information Processing at Fujitsu, Tokyo, gave the Japanese market outlook, noting that Miti, the Japanese ministry of trade and industry projects 30% a year growth for computers through March 1976. As of March, 1972, there were 12,000 computers valued at $3.7 billion in Japan, with growth estimated to 38,000 computers valued at $11.4 billion by March 1976.

He pointed out that Miti was encouraging the six computer manufacturers to form into three pairs in order to strengthen the domestic industry against the upcoming liberalization of import of computer processors, software and terminals. The combination of Fujitsu and Hitachi has created a computer combine which is now larger than IBM Japan in marketshare; the Fujitsu-Hitachi group has 31.6% of the market, IBM 29%. Miti is awarding $110 million in development grants to the three pairs of Japanese computer manufacturers to stimulate their development of a 3.5 generation of computers and peripheral equipment to compete primarily with the IBM product lines.

Nakahara observed that on-line systems were developing very well in Japan. On-line operations cover 60% of total savings account transactions. By the end of 1973, an expanded bank information system will cover 6800 separate branches of 87 Japanese banks, and by 1975, over 80,000 transactions a day are expected to be processed by the system. Also, Nippon Telephone and Telegraph Co., has begun to make data communications circuits available to commercial organizations. In April 1972, general timesharing companies were permitted access to data communication lines. There are now six intended vendors in the timesharing market in Japan and the value of the business and number of firms is growing rapidly. NTT is also an active competitor in the timesharing business offering an on-line service for scientific and engineering calculations called Demos, as well as one for commercial and accounting transactions called Dress. Six thousand active terminals are estimated to be currently employed in the NTT system.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

IDC LIBRARY

"THE GRAY SHEET" NOVEMBER 30,1972 • VOL.8,NO.2 P.J.McGOVERN,EDITOR

Directions for growth

MINICOMPUTER SHIPMENTS UP 50% BY VALUE IN 1972 AFTER THREE-YEAR PLATEAU; OUTLOOK BRIGHT FOR SENSOR-BASED APPLICATIONS, BRILLIANT FOR COMMUNICATIONS

No question about it: The minicomputer business is booming.

Shipments of dedicated application computers (which include minis, see page 5) by U.S.-based companies should add up to about $550 million according to latest estimates of the International Data Corporation, publisher of EDP Industry Report. This is up 50% or so from last year's $360 million, a figure roughly on the plateau reached in 1969 and maintained during 1970.

These preliminary results are significantly better than earlier expectations, and directly reflect the one portion of the computer industry where the administration's Phase II has played an important role.

This growth, also, is large enough to cloud the change that is occurring in the marketplace. Indeed, the situation in the dedicated application computer marketplace well illustrates one of the few maxims of the information processing industry: Change is certain.

This article outlines the changes EDP/IR sees in progress. Some of them are quantified, others are simply pointed out for further study. The signals for change have seemed clear for some time (EDP/IR June 25,1971); business conditions had a damping effect on movement, but "good times" seem to be back in the cards. And there are trends worth watching:

- Communications is the key to growth. In addition to vast numbers of minicomputers being delivered for direct communications applications, more and more equipment deliveries will be in some way linked to a computer-based communications network.

- OEM sales of minis are still important. But decreasing prices of "bare bone" minis will -- within a few years -- bring the expected competition from sophisticated solid-state electronics, the "computer-on-a-chip."

- Peripherals will become much more important, and the average price for countable dedicated application computers (rather than logic boxes) will hold up well despite declining CPU and memory costs.

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Minicomputer growth . . . and GROWTH!

Stepups in capital spending are foreseen by most economists, and plans for better manufacturing control and distribution systems have been incubating during the lull of 1970-1971. Thus, purchases of dedicated application computers in the U.S. are virtually certain to sweep upward during the next several years (see page 4). The boxes on these two pages indicate the types of applications where most growth can be expected and spell out why others won't do so well.

A LESSON FROM HISTORY?

The minicomputer industry was born with DEC's first deliveries of the PDP-8 in 1965. And the original applications for these computers -- applications EDP/IR has described as economical luxuries -- are those where dedicated application computers are used today. They actually cover the spectrum, and when examined today point to the future of dedicated application computers.

+ Personal computers for scientists and engineers have become somewhat less important with the advent of timesharing terminals and relatively inexpensive programmable calculators. This trend should continue.

+ Mini-based systems for monitoring or data acquisition are still important, and will continue to be so. Some of these type applications, however, will be upgraded to full-scale control systems or incorporated -- through communications lines -- into portions of business processing networks.

+ OEM purchases of minicomputers -- for incorporation into sophisticated systems, machine tools, or multiple-station data input devices -- have been (and often still are) the most economical solution for a control function. In the future, however, special function boxes based on today's and tomorrow's electronics will be the least expensive way to perform many control functions.

+ Process control systems, in the past, have relied on large equipment primarily manufactured by general-purpose computer manufacturers. These systems -- with all their sensors for input -- cost many times the value of the computer that runs them, and often tie in with an organization's business computers. Such systems will become increasingly important in both continuous and discrete manufacturing, and at least half the spending for dedicated application computers will be in this area for years to come.

+ Communications networks thrive on minicomputers for control and message concentration. Additionally, there will continue to be growth of "Value Added Networks" of the type Arpa has set up. Couple this with the growth of company-wide networks of all types, and the fantastic growth projections for minis in communication applications begin to be understandable.

Thus, the function of the minicomputer is more necessary than ever. In some situations, this function can be replaced by today's or tomorrow's electronics; in others . . . enough to triple the number of minis in use by the mid-1970s . . . minicomputers will keep doing their thing.

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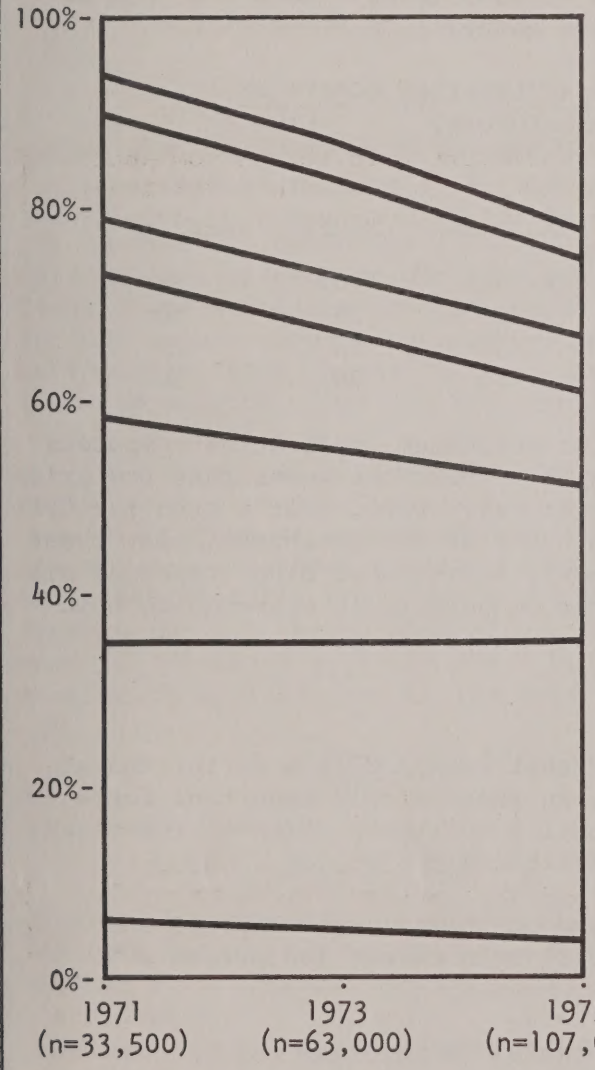
But this is relative. With the installed base expected to grow so rapidly in both numbers and dollars, even the industry segments that are beginning to "suffer" will look like lucrative growth areas over the short term. Application areas that will be losing market share -- general-purpose scientific, small business configurations, data conversion -- will be growing 25% in number installed.

And among the "slower" growth areas are the OEM markets, where profit per unit is not so great and competition from traditional electronics suppliers is

U.S. INSTALLED BASE OF DEDICATED APPLICATION COMPUTERS
Per Cent Distribution by Number: 1971 - 1975
(Copyright 1972, International Data Corporation)



Application/Function	1971	1975
COMMUNICATIONS	6%	22%
BUSINESS CONFIGURATIONS	4%	3%
GP SCIENTIFIC/ENGINEERING	11%	8%
DATA CONVERSION	6%	6%
DATA COLLECTION	15%	10%
MONITORING	23%	16%
CONTROL	29%	31%
MISCELLANEOUS	6%	4%
	100%	100%

WHILE TRIPLING in number between 1971 and 1975, the U.S. installed base of dedicated application computers will grow in value from $1.7 billion to $3.2 billion. Communications will be the big growth area, with control functions gaining at the expense of simple data collection and monitoring systems. Many OEM applications for minicomputers today will be functionally replaced by special circuitry -- the so-called "computer-on-a-chip" -- as the decade of the 1970s moves along.

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potentially quite significant. But even this portion of the minicomputer market looks promising for the next few years . . . at least until the price cutting by minimanufacturers reaches the level of custom-tailored circuits from semiconductor houses. EDP/IR's inputs -- manufacturers and potential customers alike -- all point to a rapidly growing market good for buyer and seller alike, strange as that might seem.

Exact numbers of dedicated application computers -- especially the minis that go to OEM's and the mixture of what some manufacturers are calling microcomputers (such as DEC's PDP-16) that aren't counted by EDP/IR -- are harder and harder to estimate. But the dollar signs look good. And, so long as we keep a definition of a computer that includes at least 4K of memory, a valid instruction set, and operator programability, we see the average system price holding within a fairly constant range -- the $30,000 level. Here's a look at where things have been, and where IDC sees them going:

WORLDWIDE SHIPMENTS OF DEDICATED APPLICATION COMPUTERS
(By U.S.-Based Manufacturers)

	Number	Percent Growth	$ Value	Percent Growth	Average $1,000
1970	10,900	30%	$ 330M	0%	30
1971	12,200	12	360	13	30
1972	18,000-21,000	37	550	52	29
1973	22,000-25,000	33	715	30	30

This relatively constant average price for dedicated application computers may seem counter to what appears to be happening. "Everyone knows that the price of minis is plunging," the casual observer might say. Well, that's true for CPU and memory, and thus is applicable to certain types of OEM purchases. But these are a declining percentage of the total business, and in most other types of situations the cost of peripherals or other system components is expected to hold the average prices up there.

A little "help" from IBM

System/7 -- IBM's sensor-based processor that fits EDP/IR's definition of dedicated application computer -- is becoming an increasingly important force in the marketplace, and as such may begin to quantify a large portion of the mixed-up mini business. A few observations about System/7:

- With an "average" price of $55,000 based on initial user reports and calculations by EDP/IR, this machine will help offset low-priced OEM minis in the calculations shown above.

- To date, according to IBM, the mix of rental to purchase for S/7 has been about the same as its other computer business. Depending on how IBM defines "other" in the above, this means that some 60+% are going out on rent. As evaluation units prove out and turn letters of intent into volume orders, however, this could shift more toward purchase; many System/7s are going into plant situations where equipment is considered a capital investment.

- Volume deliveries are about to begin, and promised delivery times have

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WHO'S WHO in the WHAT Marketplace

That portion of the computer industry discussed in this issue is difficult to quantify. Most people modify definitions to emphasize their point of view. Since EDP/IR's point of view is to provide interpretation, and since we have worked with a consistent set of definitions for several years, we have framed this issue around what IDC terms the Dedicated Application Computer Market. The heart of this market is what IDC calls Group B computers.

Group B computers, as covered regularly by EDP/IR's Census (see the Nov. 6, 1972 issue for the most recent), include those commonly called minicomputers and certain larger systems usually designed or used for one application, such as process control, data acquisition, or the like. These computers are usually purchased, and predominantly programmed in assembly language or Fortran. They are categorized as:

Price Class 1 -- less than $25,000 average system price;
Price Class 2 -- $25,001 to $50,000 average system price;
Price Class 3 -- $50,001 to $100,000 average system price;
Price Class 4 -- more than $100,000 average system price.

In general, computers in Class 1 and 2 are those commonly called minicomputers, and include the stripped-down processors sold OEM in large quantities. Class 3 and 4 include many of the older,predecessors to the mini; they also include sensor-based computers -- such as IBM's System/7 -- that will play an important role in the future. Computers for such applications will continue to make up more than half the installed base (see page 3).

To acknowledge at least two ways of measuring this marketplace (or the performance of manufacturers that supply products), EDP/IR has extended its mid-1972 Census of Dedicated Application Digital Computers and has summarized it in two ways, shown below. Numbers and dollar extensions presented here are taken directly from the Census referenced above. Worldwide installation figures for U.S.-based manufacturers are reflected here, since in general some 80% of the base is in the U.S. At midyear-1972, IDC lists 52,660 systems worth $2.4 billion at the average prices published in EDP/IR:

DEDICATED APPLICATION COMPUTER MARKET

Minicomputer Suppliers % Installed, by Number		Group "B" Suppliers % Installed, by Value	
Digital Equipment	42.0%	Digital Equipment	19.1%
Hewlett-Packard	8.7	IBM	12.6
Varian	7.1	Honeywell Information Systems	11.5
Data General	6.6	Control Data	11.3
Honeywell Information Systems	4.8	Xerox	6.6
Microdata	4.3	Hewlett-Packard	5.8
General Automation	4.0	General Electric	5.2
Interdata	2.8	Collins	4.0
Computer Automation	2.7	Systems Eng. Labs	2.5
Lockheed	2.3	Varian	2.4
Others	14.7	Others	19.0
(n = 42,638, Class 1 and 2)	100.0%	(n = $2.408 billion)	100.0%

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lengthened. This reflects prior sales efforts on the part of IBM, the improved economic environment, and the lead times of capital spending.

System/7, as EDP/IR has pointed out previously, represents IBM's wedge into an organization's production operations much as the 1401 brought computers to accounting . . . and to board room discussions. Now, in fact, IBM itself is making this point quite clear.

At the International Machine Tool Show held in Chicago during September, IBM had a display showing how a System/7 could tie together a machining, inspection, quality reporting, and parts flow operation. Even more important, it seems to EDP/IR, was the multi-color "Production Automation" chart that IBM was distributing at its booth. This shows how IBM looks at System/7.

With the notation that "the plant automation applications shown are running in different companies in different parts of the world," IBM's chart depicts a manufacturing department tied via a plant communication loop with a plant computer (360 or 370) that also coordinates other loops such as R&D, heat treating, etc. The plant computer, with its own data base, is shown connecting to the corporate computer -- where a vast data base allows order entry, sales forecasting, and corporate strategy.

Two things are important about this chart. First, it shows by color code the application zones where System/7s abound. They are

- plant communication
- machine control
- machine monitoring
- mechanical testing
- electrical testing
- facilities & environmental control

Second, the chart and the IBM personnel echo the basic philosophy behind IBM's strategy: Build large data bases that need disk files and large central computers to be valuable. With such a setup, it seems to follow, an organization can begin to have "reality . . . not just data."

In any event, IBM salesmen have been told to sell System/7. They have been given certain direct incentives, EDP/IR understands, but the strongest one is that System/7s will product vast quantities of data, and it takes 370s and large disk files to process data. The word is out, and deliveries of IBM's sensor-based processor are very likely running at the 10 per working day rate.

Ingredients of success

Other manufacturers, of course, are pumping out machines. And they stand to gain from IBM's massive educational efforts in production automation. But this unified approach to a previously hit-or-miss environment brings challenges:

- Peripherals become important for minis. The types are different, to be sure, but necessary. And the minimanufacturer that doesn't have this capability will eventually suffer, since more of the profits are in non-CPU system components.

- Software support is a must. And not much is provided. Machine tool manufacturers, for example, have found that they often must develop software -- and that they can then sell it for a profit. Investment in this area is crucial for profitable mini production.

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Protection up to Congress

SUPREME COURT UNANIMOUSLY RULES OUT SOFTWARE PATENTS; LITTLE EFFECT EXPECTED

In one of its rare hearings of a patent case, the Supreme Court on November 20 ruled 6-to-0 that Gary Benson and Arthur Tabbot have no right to patent their software program for telephone network switching. The decision, brought to the High Court by the Patent Commissioner, reversed last year's action by the Court of Customs and Patent Appeals. Killing any patent protection under existing law (though nebulous copyright protection still exists), this sets the stage for patent advocates to heed the Court and ask Congress to spell out software protection.

Justice William O. Douglas, in the majority opinion, predicated the denial of patent right on the vagueness of the resulting monopoly. Patents can be used to protect industrial processes, he said, but the "process" represented by a software package is so "abstract and sweeping" as to approach the nature of an unpatentable mental process or intellectual concept.

While the exact nature of the Court's reasoning is arcane, the results are consistent with rulings in other cases involving new technologies in the computer and communications field. The Court consistently avoids the labyrinthine philosophical questions of definitions and rights, referring all such matters to the "Solomons" on Capitol Hill.

As a result of the decision, bills for extending patent protection to software will be introduced during the next session of Congress, but it is unlikely that any legislation will result. The forces arrayed against patentability -- all of the mainframe manufacturers plus the Patent Office itself -- are formidable enough to assure stalemate either in the Judiciary Committees or on the floor. So for the present, it looks as if software firms will have to live without any formal protection.

Where does this leave the software industry? Right where it was before the decision (see IDC estimates below). The major task for firms in the software business has always been marketing, not protection. The company that sells software is likely to spend twice the development cost on marketing, installation, customization, training, and the like -- a fact that discourages copying of all but the most saleable products. Few of today's packages fall into that class.

The software industry -- a two-headed beast

As a software "industry" has developed, there have been problems of market definition and formulation. But neither of these is affected by the decision.

SOFTWARE INDUSTRY GROWTH ($ Millions)
(Copyright 1972, International Data Corporation)

	Packages	Custom	Total
1969	$ 40	$315	$ 355
1970	75	365	440
1971	102	346	448
1972	126	278	404
1973	159	320	479

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Custom software, single-user special programs written by an outside firm, is currently taking a drubbing, as the table shows. There are several reasons:

- Users of 360s and other third-generation computers have most of the software they need. The press for software so prevalent in the mid-1960s has eased off. And as these users migrate to 370s or other current generation computers, they can transfer programs directly, without the "reset to zero" situation that once created custom software demand.

- In-house software staffs have much more capability today. They proved themselves during the cuts in outside spending brought by the recession, and are expected to handle most new applications as business expansion warrants more effort in this direction.

- Management attitudes have changed (EDP/IR June 30,1972). Many managers like more control over operations than an outside supplier provides.

Consequently, EDP/IR forsees only a slow turnaround for custom programming, with growth pegged to the economy rather than the computer industry, unless the Federal Government funds massive programs with the complexity of those created by the aerospace industry in the early and middle 1960s.

Packaged software, as the table also shows, should maintain an impressive growth pattern, despite the Supreme Court decision. Competition in this sector has not been substantially altered. The task faced by companies in this market is to identify potential customers and to develop products that are considerably less expensive or better than what the in-house programmers can provide. Rather than relying on the patentability of their products, companies competing for dollars in this marketplace emphasize their strengths. Three types of suppliers are:

- Mainframe manufacturers that continually build their libraries of programming aids and applications programs -- some "free" and some offered for separate sale. Marketing costs are reduced because of "piggyback" promotion; support is available at almost every branch office; user feedback leads to continual product improvements.

- Large software users, such as banks, don't worry much about patents or even exclusivity of product. Rather, these users who are peddling their own programs claim the first-hand experience with operational problems that only a user can incorporate into a system.

- Independent software firms, of course, claim their own set of advantages. Unlike the mainframer or the user/vendor, the independent devotes full time to software development. Documentation tends to be more thorough, the programs more inclusive. The independent's principal disadvantage is getting his message to the potential customer.

A few independents have been successful. Applied Data Research's Autoflow flowcharting program and Informatics' Mark IV file management system illustrate what can be done. Both systems were introduced without benefit of patent protection. And both are successful. Autoflow currently has over 1600 users (more than four times the number claimed by a competitor, National Computing Industry's Quickdraw) and a renewal rate of 80%. ADR concentrates on updates, training, and customer help in installation. Mark IV, users claim, is simply more efficient than in-house attempts. So, to date, success hasn't depended on patents.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

IDC LIBRARY

"THE GRAY SHEET" DECEMBER 7,1972 • VOL.8,NO.3 P.J.McGOVERN,EDITOR

360/370 Migration

EXTENSIVE SURVEY INDICATES 15% INSTALLED BASE GROWTH FOR IBM IN U.S.; CHALLENGES AHEAD FOR INDEPENDENT PERIPHERAL AND THIRD-PARTY LEASING COMPANIES

When IBM's System/370 was first introduced in 1970, industry observers assumed -- as the Computer Giant's management announced -- this would be the major computer industry force during the early 1970s. Yet, the facts didn't support this conclusion. The 370 looked like a dressed up 360. It turned out, of course, that IBM had elected to introduce the 370 piecemeal . . . a little earlier than planned to offset the impeding recession, but not in full until late this summer (EDP/IR Aug.15,1972) when "a turning point in computer economics" -- virtual storage -- turned out to be the real System/370.

And the International Data Corporation, publisher of EDP Industry Report, was finding out how computer users would react. Even before virtual storage was announced, an extensive mail survey gave clues. Telephone followup in the early fall verified the data. Now, after extensive analysis by IDC, the attitude and commitment by users is clear. Some of the findings:

- The universe of computer users is dividing into two parts -- those with strings tied to IBM and who are already giving longer term commitments than they did with 360; and the others. No product of any other mainframe is important in IBM user migration plans.

- For the next year or so, third-party leasing companies will have little trouble keeping their 360s on lease. But, the survey indicates, releasing will eventually become a problem as users upgrade to get 370 features. This is movement along a "one-way street," since, once committed, a user is unlikely to return to even bargain-priced 360s.

- Among the independents, tape drive suppliers with 3420-compatible products are in good shape, since deliveries began early; but 3330-type disk drive suppliers will feel the pinch from IBM's early deliveries and extended-term lease lock -- they will have to work hard to succeed.

All this fits IDC's finding that the installed base of 370s will peak during 1976 and begin to undergo replacement by what EDP/IR calls the "last generation." IBM will have led the way into a new era of computing with large CPUs -- operating in virtual mode -- and vast memories at the heart of distributed networks.

EDP Industry Report and Market Review is published twenty-four times each year by the International Data Corporation, 60 Austin Street, Newtonville, Mass. 02160. Entire contents © 1972 by the International Data Corporation. James Peacock, Managing Editor; Carol Chapman, Jack Colantino, Nancy Scull, Associate Editors; C. Oakley Mertz, Research Analyst; Arthur Whelan, Circulation Manager. Patrick J. McGovern, President, International Data Corporation; William Leitch, Vice President/Subscription Services; Walter Misdom, Vice President/Industry Analysis. Editorial ideas and information are collected from numerous industry experts, and are researched and formulated by members of the editorial staff. The information and opinions contained in each issue are based on the best information available, but their accuracy and completeness cannot be guaranteed. Subscriptions: One Year, $95. Single copies, priced as indicated on inside pages, airmailed same day requested. Prices for multiple copies available on request. Telephone (617) 969-4020. Reproduction without written permission is completely forbidden.

In addition, the rental base of 360s will dwindle away to almost nothing by 1974. The base of 360/30s and above in the U.S. will drop from almost 11,000 at yearend 1971 (chart, page 3) to the 4,500 level, and only a quarter of those will still be on rent from IBM. Thus, the owners of 360s will have little market for used systems in the mid-1970s.

Users call the shots

Despite the fact that economic conditions were changing -- and IBM kept adding new products -- during the period users were being surveyed about their migration plans, answers were consistent. The simple fact of the matter is that computer users are busy implementing cancelled or postponed applications from the earlier 1970s. And, more often than not, the influx of new applications is providing the necessary justification for additional or new EDP hardware. As the table below shows:

+ Well over half the sites surveyed say that the acquisition of new hardware revolves primarily around implementation of new applications.

+ Of somewhat lesser concern -- but still of importance to many users that are in the process of acquiring new hardware -- are greater throughput and better communications capabilities.

+ Interestingly, only 35% of the users are replacing older 360 equipment with the primary or secondary goal of facilitating flexibility in the upgrade process.

COMPUTER HARDWARE ACQUISITION JUSTIFICATION CRITERIA

(Copyright 1972 by International Data Corporation)

Criteria	Primary Consideration*	Secondary Consideration*
To Implement New Applications	57%	23%
To Handle Existing Applications More Economically	38%	27%
To Increase System Throughput	44%	21%
To Increase Communications Capabilities	34%	25%
To Replace Older Equipment, Allowing More Flexible Upgrade	16%	19%

* Represents percentage of sites responding

Paths of migration

Among users of 360/30s and up surveyed, IDC found a definite shift of emphasis toward larger systems, reflecting more large data base applications. At the peak of the 360 era, a rough rule of thumb was that for every eight 30s installed there would be four 40s, fewer than two 50s, and not even one 65. In the developing 370 population, it looks to IDC as if for every eight 135s there will be four 145s, four 15Xs, and more than one 16X. More numbers, many more dollars!

And this movement is happening. Over 40% of the some 600 computer installations responding say the physical change would take place during 1972, and an additional 20% of the sites expect similar movements during 1973. With IBM's inser-

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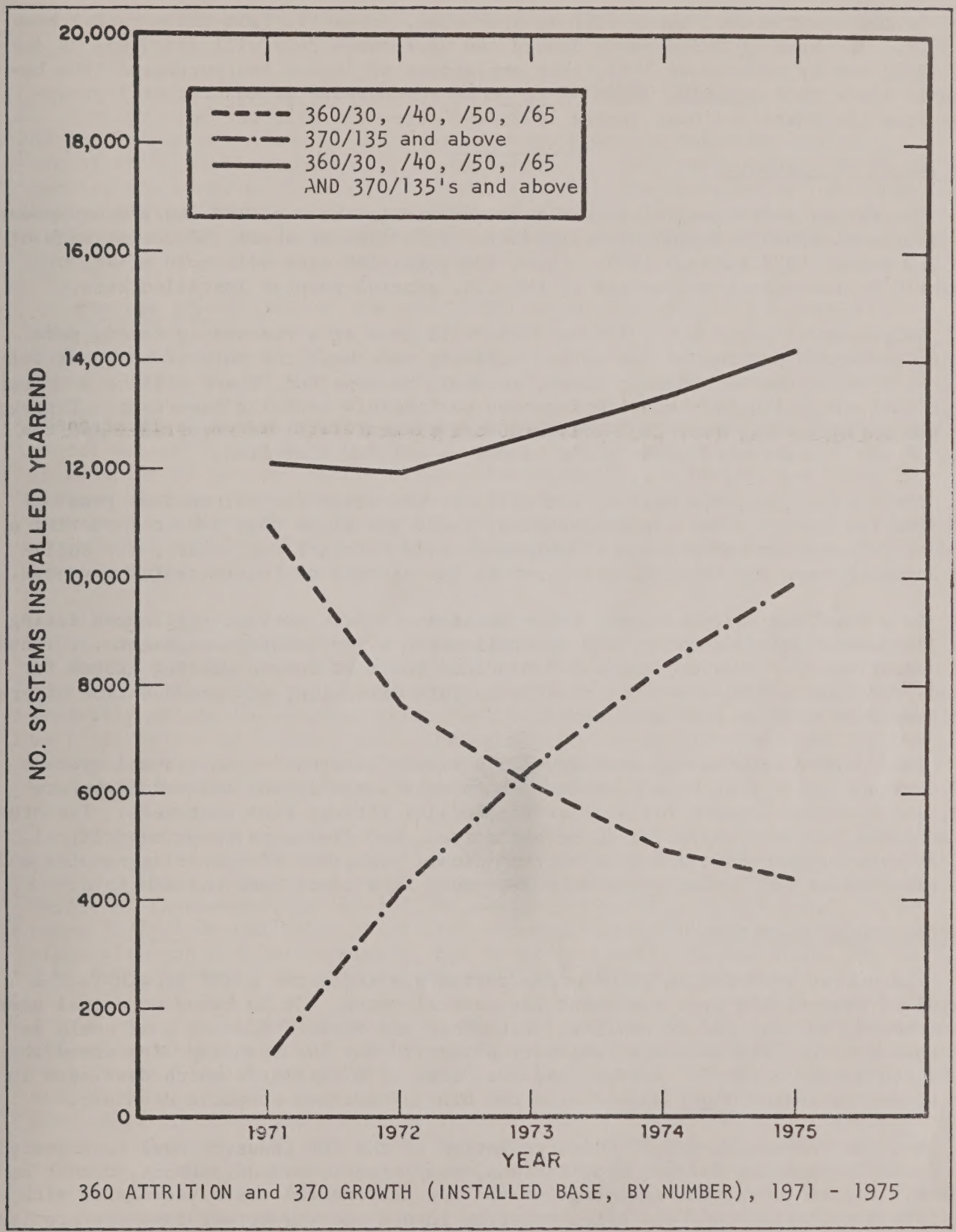

360 ATTRITION and 370 GROWTH (INSTALLED BASE, BY NUMBER), 1971 - 1975

tion of 158s and 168s into the migration path, users report that migration to 370 will quiet down during the early portions of 1973. Once VS models are available, however, the 360 movement to 370 will regain speed.

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As the chart shows, there will be attrition, primarily from IBM's rental base of 360s. The base of third-party leased and user-owned 360s will drop only 2% during 1972; but by the end of 1973, user employment of leased and purchased CPUs begins to slide more quickly. Some 5% to 7% of the non-IBM owned CPUs will disappear from the installed base during 1973, and attrition will set in.

The impact of migration

The survey indicates that the domestic installed base of IBM 360/370 equipment (including attached independent peripherals) will grow at about 15% during each of the 370 years, 1972 through 1975. Thus, the total IBM base will hold steady or slightly increase as a percentage of the U.S. general-purpose installed base.

Shipments of newly built IBM hardware will grow at a reasonably steady pace. During the early portion of the period (already underway) the bulk of shipment dollars will be in the mainframes; later, as would be expected, there will be a transition of product mix, with add-on or replacement peripherals becoming important. Throughout the period, of course, IBM's System/3 and System/7 will be important, and the role of 125 -- announced after IDC's survey -- will be clarified.

Clearly, during this period, IBM will set the stage for yet another round of CPUs for the later 1970s. In preparation, there are signs that IBM is fostering a gradual increase in the portion of shipments sold outright each year . . . building customer base and immediate revenues at the expense of future rental payments.

As a corollary to the above, other mainframers face serious challenges during the 370 years. For one thing, the centralization of corporate management . . . and EDP operations . . . hurts, since 370 provides the most common meeting ground for standardization. IBM's push is clearly in this direction; its product line offers excitement as well as easy acceptance.

Thus, other mainframers must develop a viable alternative to virtual storage and convince users they have a choice. Burroughs actually was there long before IBM, and this may account for some of its loyalty ratings from customers. The other mainframers, however, have yet to be heard from, and timing is becoming critical. IDC surveys suggest that brand loyalty continues high, but VS operating results and yet unannounced 370 hardware and software could lure users into the IBM fold.

"Environmental questions"

The survey reported in these pages definitely indicates a 15% growth in the installed base of IBM-type equipment for several years. It is based on actual user commitments, and represents reality. But there are certain factors that could deter this growth. The ultimate budgetary authority for EDP spending lies above the users contacted in the IDC survey, and the "stay slim" attitude which developed in the recent recession might appear with the hint of another economic downturn.

But the "recession-proof" characteristics of the EDP industry have been beefed up. Today's spending for new applications, many tied to communications, cannot be undone. So, as users take advantage of the low incremental costs associated with the latest hardware, they are often steering into a one-way street that may promise suppliers the continued revenues inherent with 15% growth. This may well by why IBM casually called virtual storage a turning point. Once implemented, VS computer operation cannot easily be undone, and probably will require continued spending on hardware . . . albeit at the expense of salaries.

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Helpful hints

SOME COMMENTS ON EDP/IR'S COMPUTER CENSUS

On a fairly regular basis, EDP Industry Report gets a telephone call . . . or one of IDC's staff members gets buttonholed . . . and there are questions concerning the Computer Census that we publish on a quarterly basis (see page 6). Since we haven't spelled out our philosophy on the Census, and since some additional changes are being made in this issue, as they are in many, we think a few words of explanation are appropriate.

Average price. One of the most complicated elements of the General Purpose Computer Census is the "average monthly rental" figure published with each computer system. It is used widely in estimating a particular manufacturer's revenues, yet requires as much estimation as the number installed.

Upon announcement of a new system by a manufacturer, we take the "typical rental values" given with the announcement, and weight them into a first approximation of average rental value. The weighting is to take two times the minimum plus one times the maximum rental and divide by three. If a system were announced in the $5,000 to $15,000 a month range, for example, our technique would produce $8,333 a month. Historical comparisons indicate that this is a reasonable approach.

After the system has been in production for six to twelve months, we examine the IDC data files and do some configuration pricing analysis to see if the systems are, in fact, being delivered as expected. We also get periodic inputs from some manufacturers as to how our estimates stack up. We gradually adjust the average price for the basic fact that systems tend to be first delivered at one level, then gradually go through "upgrade" cycles as users add more core and peripherals. This tends to average 5% to 15% a year until models reach their "mature" average values.

By definition, we attempt to calculate the "list" price -- not reflecting systems sold with educational or multi-year discounts (as appropriate to Honeywell); those under third-party lease (as in the case of IBM/360s); nor the impact of independent peripherals on a system's price. In all cases, we attempt to include the value of central processor and main memory, on-line peripherals, and on-line terminals, but to exclude off-line equipment such as data entry devices. We also exclude software purchased separately.

We have recently completed a massive mailing to the IDC data file specifically asking for prices being paid, and have reflected this in the current Census. One major observation is IBM's System/3. We had been estimating $1100 and $1600 respectively for the 3/6 and 3/10 models. It now appears that the averages are actually more like $1535 and $2290; in addition, System/3 users pay IBM about $345 for data recorders and $95 a month for software. These figures, as explained, are not included in average rental.

Retrocasting. When a Census is published, it is IDC's best estimate at that point in time. Therefore, anyone attempting time analyses must remember this, and make allowances for prior estimates that may have been high or low at the time they were made. Comments are always welcome.

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GENERAL PURPOSE COMPUTER CENSUS

Counts in the General Purpose Digital Computer (Group A) Census, shown below, are based on the best information available to the International Data Corporation, but are estimates. Computer manufacturers, as a rule, do not directly supply this type of information, and it is only through the use of IDC's extensive data files and other information sources that such estimates are possible. The computers included in Group A comprise the bulk of digital computers (by value) in operation. They are byte or character oriented -- with the exception of large-scale scientific machines -- and are primarily programmed with higher-level languages. In addition to this Census, EDP/IR publishes a Dedicated Application Digital Computer (Group B) Census that includes minicomputers and specialized-purpose machines.

AS OF OCTOBER 1, 1972

NAME OF MANUFACTURER	COMPUTER MODEL	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Burroughs	205	$ 4,600	1/54	0	5	5	X
	220	$ 14,000	1/58	1	2	3	X
	B-100 Series	$ 3,300	8/64	6	0	6	X
	B-200 Series	$ 5,600	11/61	176	140	316	X
	B-300 Series	$ 5,200	7/65	475	105	580	X
	B-500	$ 6,000	11/68	480	490	970	X
	B-1712	$ 1,950	8/72	30	0	30	NA
	B-1714	$ 2,200	8/72	20	0	20	NA
	B-1726	$ 5,300	2/73	-	-	-	NA
	B-2500	$ 8,200	2/67	275	150	425	X
	B-2700	$ 8,700	8/72	10	0	10	NA
	B-3500	$ 14,700	5/67	565	370	935	40
	B-3700	$ 21,000	11/72	-	-	-	NA
	B-45/4700	$ 28,000	10/71	50	6	56	35
	B-5500	$ 35,000	3/63	110	40	150	X
	B-5700	$ 28,500	12/70	25	4	29	15
	B-65/6700	$ 50,000	11/69	39	45	84	12
	B-7700	$120,000	2/72	1	0	1	6
	Subtotal			2,263	1,357	3,620	108 +
Control Data Corp.	G-20	$ 19,600	4/61	5	9	14	X
	1604/A/B	$ 42,000	1/60	25	4	29	X
	31/3150	$ 9,000	12/64	81	54	135	X
	3170	$ 17,500	12/70	15	7	22	6
	3200	$ 14,700	5/64	58	51	109	X
	3300	$ 28,800	9/65	120	115	235	10
	3400	$ 23,700	11/64	4	10	14	X
	3500	$ 26,000	1/69	11	16	27	3
	3600	$ 48,000	6/63	21	20	41	X
	3800	$ 53,000	12/65	14	4	18	X
	6200	$ 39,000	11/70	2	3	5	X
	Cyber-72	$ 32,900	10/71	5	8	13	6
	6400	$ 54,000	5/66	58	44	102	X
	Cyber-73	$ 47,000	3/72	4	3	7	6
	6500	$ 68,000	12/67	13	8	21	X
	6600	$115,000	8/64	58	37	95	X
	Cyber-74	$105,000	3/72	3	1	4	5
	6700	$125,000	7/70	3	1	4	X
	7600	$165,000	1/69	12	3	15	X
	Cyber-76	$165,000	3/72	2	0	2	4
	Star-100	$250,000	8/72	-	-	-	1
	Subtotal			514	398	912	41
Digital Equipment Corp.	PDP-6	$ 10,000	10/64	16	9	25	X
	1040/1050	$ 13,300	10/67-12/71	156	69	225	15
	1055	$ 25,000	12/71	16	4	20	10
	1070/1077	$ 34,600	7/72- 9/72	1	0	1	5
Friden	System 10	$ 2,500	10/70	315	135	450	450
Honeywell Information Systems	Gamma 10	$ 2,100	7/64	-	1,020	1,020	X
	G-5X Series	$ 1,550	1/66	310	2,150	2,460	500
	G-105	$ 1,350	3/69	50	160	210	20
	G-115	$ 2,700	4/66	340	1,200	1,540	X
	G-120/130	$ 4,500	10/69	35	390	425	50
	G-205/215	$ 4,500	9/63	12	0	12	X
	G-210	$ 16,000	3/60	17	0	17	X
	G-225/255	$ 13,008	4/61	120	23	143	X
	G-235/265	$ 17,000	4/64	55	30	85	X
	G-245/275	$ 18,000	2/68	4	3	7	X
	G-405/410	$ 9,000	2/68	28	16	44	X
	G-415/420	$ 14,000	5/64	171	245	416	X
	G-425/430	$ 17,000	6/64	68	100	168	X
	G-435/440	$ 22,000	9/65	54	37	91	X
	G-615	$ 55,000	6/69	14	22	36	X
	G-625	$ 65,000	4/65	1	3	4	X
	G-635	$ 80,000	5/65	55	16	71	X
	G-645	$120,000	7/66	4	0	4	X
	G-6030/6040	$ 27,000	6/71	31	27	58	90
	G-6050/6060	$ 46,500	7/71	11	9	20	37
	G-6070/6080	$ 61,500	7/71	6	4	10	23
	G-Subtotals			1,386	5,455	6,841	720
	H-105	$ 2,500	11/71	155	25	180	100
	H-110	$ 2,600	9/68	175	205	380	X
	H-115	$ 4,500	3/70	330	70	400	X
	H-115/2	$ 7,700	1/71	570	140	710	200
	H-120	$ 4,600	1/66	510	230	740	X
	H-125	$ 7,900	12/67	100	300	400	X
	H-200	$ 6,400	3/64	560	290	850	X
	H-2040	$ 9,000	4/72	40	13	53	35
	H-1015	$ 12,500	4/71	109	36	145	20
	H-2050	$ 14,100	4/72	32	11	43	29
	H-12/1250	$ 12,000	2/66	385	195	580	X
	H-2015	$ 17,800	2/71	147	43	190	25
	H-2060	$ 18,500	4/72	23	9	32	21
	H-2200	$ 19,600	1/66	130	65]	195	X
	H-2070	$ 23,000	5/72	16	5	21	14
	H-3200	$ 26,900	2/70	58	25	83	4
	H-4200	$ 31,000	9/68	31	6	37	X
	H-2080	$ 44,000	4/72	8	3	11	7
	H-8200	$ 73,000	2/69	20	4	24	X
	H-4/1400	$ 13,200	12/61	38	33	71	X
	H-800	$ 28,500	12/60	49	13	62	X
	H-1800	$ 46,000	7/64	9	3	12	X
	H-Subtotals			3,495	1,724	5,219	455
	HIS-Subtotals			4,881	7,179	12,060	1,175

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IBM	System-3/6	$ 1,530	12/70	1,980	850	2,830	1,200
	3/10	$ 2,200	1/70	6,750	2,890	9,640	2,600
	360/20	$ 3,700	12/65	7,225	5,825	13,050	X
	360/22	$ 5,800	7/71	970	130	1,100	400
	360/25	$ 7,500	10/68	1,850	1,345	3,195	X
	370/125	$ 9,800	4/72	-	-	-	NA
	360/30	$ 11,000	6/65	4,780	3,010	7,790	X
	370/135	$ 13,500	5/72	500	230	730	2,500
	360/40	$ 19,600	6/65	2,740	2,090	4,830	X
	370/145	$ 24,700	7/71	1,000	385	1,385	1,000
	360/44	$ 14,300	7/66	82	100	182	X
	360/50	$ 32,100	8/65	940	655	1,595	X
	370/155	$ 51,700	2/71	880	360	1,240	670
	370/158	$ 59,200	4/73	-	-	-	inc
	360/65	$ 69,000	11/65	525	235	760	X
	370/165	$ 89,800	6/71	165	46	211	160
	370/168	$115,500	7/73	-	-	-	inc
	360/67	$112,000	6/66	60	12	72	X
	360/75	$ 94,000	1/66	40	21	61	X
	360/85	$141,000	10/69	16	6	22	X
	360/9X	$150,000	11/67	15	3	18	X
	360/195	$188,000	3/71	10	3	13	6
	370/195	$192,000	5/73	-	-	-	8
	1130	$ 2,300	2/66	3,950	2,050	6,000	X
	305	$ 3,600	12/57	1	13	14	X
	650	$ 4,800	12/54	4	29	33	X
	1401	$ 3,700	9/60	1,600	2,050	3,650	X
	1401-G	$ 2,300	5/64	180	110	290	X
	1401-H	$ 1,300	6/67	155	39	194	X
	1410	$ 17,000	11/61	132	97	229	X
	1440	$ 4,700	4/63	420	565	985	X
	1460	$ 9,800	10/63	67	58	125	X
	1620	$ 2,700	9/60	450	330	780	X
	7010	$ 26,000	10/63	19	13	32	X
	7030	$160,000	5/61	3	1	4	X
	704	$ 32,000	12/55	2	3	5	X
	7040	$ 25,000	6/63	16	23	39	X
	7044	$ 36,500	6/63	15	18	33	X
	705	$ 38,000	1/56	8	5	13	X
	7070-74	$ 27,000	3/60	138	52	190	X
	7080	$ 60,000	8/61	54	1	55	X
	7090	$ 63,500	8/60	22	19	41	X
	7094	$ 73,400	9/62	64	10	74	X
	7094-II	$ 79,400	4/64	15	0	15	X
	Subtotals			37,843	23,682	61,525	8,544
NCR	Century-50	$ 1,950	2/71	390	10	400	120
	Century-100	$ 2,980	9/68	1,550	740	2,290	X
	Century-101	$ 2,750	10/72	-	-	-	150
	Century-200	$ 7,900	9/69	750	310	1,060	115
	Century-300	$ 20,000	2/72	22	22	44	45
	304	$ 10,000	1/60	10	1	11	X
	310	$ 1,000	5/61	8	3	11	X
	315	$ 5,000	5/62	340	350	690	X
	315-RMC	$ 11,800	9/65	50	59	109	X
	390	$ 800	5/61	180	190	370	X
	500	$ 1,100	10/65	700	1,600	2,300	X
	Subtotals			4,000	3,285	7,285	430
Philco	1000	$ 7,000	6/63	14	0	14	X
	210/211	$ 40,000	10/58	11	1	12	X
	212	$ 52,000	1/63	6	1	7	X
Standard Computer Corp.	IC-4000	$ 9,000	9/68	3	0	3	X
	IC-6000	$ 16,000	5/67	4	0	4	X
	IC-7000	$ 17,000	6/69	7	0	7	X
Univac	I/II	$ 25,000	3/51-11/57	4	3	7	X
	III	$ 25,400	8/62	41	45	86	X
	SS-80/90	$ 8,000	8/58	35	75	110	X
	418-I/II	$ 13,700	6/63	90	80	170	X
	418-III	$ 19,600	7/69	45	50	95	5
	491/492	$ 27,000	12/61	16	14	30	X
	494	$ 41,400	2/66	50	38	88	X
	1004	$ 1,000	2/63	980	1,100	2,080	X
	1005	$ 1,630	4/66	850	210	1,060	X
	1050	$ 8,800	9/63	165	155	320	X
	1103/5	$ 35,000	12/50	4	2	6	X
	1006	$ 40,000	12/69	50	60	110	20
	1107	$ 57,000	10/62	13	16	29	X
	1108	$ 68,000	9/65	130	98	228	X
	1110	$ 79,000	5/72	1	2	3	35
	9200	$ 2,300	6/67	1,600	900	2,500	75
	9300	$ 4,050	9/67	850	850	1,700	60
	9400	$ 11,600	5/69	260	235	495	80
	9700	$ 21,000	8/72	3	1	4	40
	LARC	$135,000	5/60	1	0	1	X
	Subtotals			5,188	3,934	9,122	315
	301	$ 6,600	10/60	225	16	241	X
	501	$ 16,100	6/59	32	2	34	X
	601	$ 40,900	11/62	2	0	2	X
	3301	$ 22,700	7/64	69	0	69	X
	Spectra 70/15	$ 4,000	9/65	17	0	17	X
	Spectra 70/25	$ 7,000	9/65	2	3	5	X
	Spectra 70/35	$ 11,800	1/67	160	6	166	X
	Spectra 70/45	$ 22,600	11/65	320	23	343	X
	Spectra 70/46	$ 37,400	11/68	60	4	64	X
	Spectra 70/55	$ 34,900	11/68	18	2	20	X
	Spectra 70/60	$ 40,500	9/70	18	0	18	X
	Spectra 70/61	$ 47,200	3/71	22	0	22	X
	Spectra 1600	$ 3,600	1/69	55	0	55	X
	Series 70/2	$ 11,500	7/71	120	0	120	30
Series 70/3	Series 70/3	$ 18,900	10/71	12	0	12	5
	Series 70/6	$ 29,300	10/71	30	0	30	8
	Series 70/7	$ 36,300	10/71	10	0	10	6
	Subtotals			1,172	56	1,228	49
	Totals			6,360	3,990	10,350	364
XDS	Sigma-5	$ 11,500	8/67	110	33	143	10
	Sigma-6	$ 20,000	11/70	25	4	29	8
	Sigma-6E	$ 6,100					NA
	Sigma-7	$ 24,000	12/66	90	29	119	4
	Sigma-8	$ 19,000	9/71	4	0	4	1
	Sigma-9	$ 44,000	11/71	7	4	11	2
	940	$ 24,000	4/66	80	3	83	X
	9300	$ 8,500	11/64	28	6	34	X
	Subtotals			344	79	423	25
	TOTALS			56,754	40,189	96,943	11,167

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NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

ADVANCED TERMINALS INC.

Advanced Terminals Inc., 220 Third Ave., Herkimer, N.Y., microfilm equipment developer, filed to register 200,000 shares of common. Proceeds, at $10 per share, to be used for research and development and working capital. No underwriter is involved.

CONTROL DATA CORP.

Control Data Corp., 8100 34th Ave. S., Minneapolis, Minn., mainframe maker, filed to register 41,751 shares of common of which 20,000 are issuable upon exercise of warrants issued by Syntonic Technology, Inc., 14,500 issuable upon conversion of debentures of Syntonic, 4,654 issuable upon conversion of 5% guaranteed convertible debentures of CDC International Finance Corp., and 2,597 offered at $70.79 per share.

DATA DISPLAY SYSTEMS INC.

Data Display Systems, Inc., 31 Union Square W., New York, N.Y., a services firms for the medical field, filed to register 17,935 shares of capital, issuable upon exercise of warrants held by F.S. Donahue, Santo & Co., which proposes to offer the shares at $10 per share maximum.

DCS COMPUTER SERVICES INC.

DCS Computer Services Inc., 19 Rector St., New York, N.Y., a DP services firms, filed to register $1 million of 8-1/2% convertible subordinated debentures, due 1982. Proceeds, at 100% of principal amount, to be used for working capital. The underwriter is Morgan, Kennedy & Co. Inc., 5 Hanover Sq., New York, N.Y.

IDENTICON CORP.

Identicon Corp., 300 Second Ave., Waltham, Mass., data acquisition systems developer, filed to register 200,000 shares of common. Proceeds, at $8.50 per share, to be used to repay bank loan and for working capital. The underwriter is W.E. Hutton & Co., 14 Wall St., New York, N.Y. 10005.

MCI COMM. CORP.

MCI Communications Corp., 1900 L St., N.W., Washington D.C., 20036. A specialized microwave common carrier filed 650,000 shares of common, to be offered from time to time in connection with MCI's acquistion of additional interests in six of its 17 subsidiary and associate companies.

MSI DATA CORP.

MSI Data Corp., 340 Fischer Ave., Costa Mesa, Calif., source data entry systems manufacturer, filed to register 320,000 shares of common acquired by Westland Capital Corp. upon exercise of warrants. Westland prosposes to distribute these shares to holders of its stock at the rate of 1.6 MSI shares for each Westland share.

ODEC INC.

ODEC Inc., 25 Graystone St., Warwick, R.I., printer manufacturer filed to register 800,000 shares of common. Proceeds, at $8 per share, to be used for product development and for working capital. The underwriter is Lepercq, de Neuflize & Co. Inc., 345 Park Ave., New York, N.Y. 10022.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" DECEMBER 19,1972 • VOL.8,NO.4 P.J.McGOVERN,EDITOR

Grosch on growth -- page 5

FALL JOINT EXUDES AIR OF UPBEAT REALISM, REFLECTS USER INVOLVEMENT; INFOREX ANNOUNCES SPECIALIZED DATA ENTRY UNIT FOR TURNAROUND DOCUMENTS

It was Southern California according to the map, but the weather was cold . . . and it actually rained. Inside, the last Fall Joint was calm but together. It reflected both the changing nature of Joints and the return to health of the computer industry. The affair was a success.

The most significant aspect of the show in general was the budding boom for terminals and data communications. Over half the exhibitors showed some type of data entry equipment or communications terminal, and a good percentage of the remainder were involved in supplying components to terminal manufacturers. Highlights of the Show, as seen by EDP Industry Report, accentuate this aspect of the computer business.

- The only important new product to be introduced at FJCC -- a "multimedia" input system from Inforex (page 3) -- reflected both the need for "in-line" processing and the move to more specialized equipment.

- One possible trend in information processing -- the value added network (VAN) -- was explored and debated at sessions, with different "schools" advocating different outlooks.

- The continuing "battle" between the mini and the supercomputer was the focus of several sessions. At one, pegged to developments in technology and computer architecture, Herb Grosch, outspoken as usual, made the first strong statement EDP/IR has ever heard at a Joint about the IBM-inspired facts of life . . . that marketing, not technology, reigns supreme . . . that manufacturers, not users, still call the shots (page 5).

So, everything considered, Disneyland proved a fitting setting for the last of the semi-annual computer conferences . . . left an appropriate "taste" for the first National Computer Conference scheduled for New York City in June. In fact, things were perhaps a little too "correct" -- just enough out of perspective to seem completely in order -- the same way they are made to appear in Disney's interpretation of both the past and the future.

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The business atmosphere

During the FJCC, researchers from the International Data Corporation, publisher of EDP/IR, contacted top marketing people to measure the mood of the industry. A mail followup of this spot survey is in the works, and the responses will be reported in the yearend issue scheduled for next week. In the meantime, however, a few of the highlights . . . especially those that relate to topics in this issue . . . are worth noting:

- The OEM business isn't dead. Component-oriented companies at FJCC are pleased with their anticipated 1972 results, and they look for an excellent year in 1973. This, of course, is a leading indicator for shipments of end-user products next year.

- Minicomputer manufacturers expect stiffer price competition, so are moving to penetrate end-user application markets and to capture more shipment dollars by building peripherals. Yet, 1973 hints of a "plug-compatible" problem for minimakers as large OEM buyers purchase add-on memory from independents and tack it onto bare-bone CPUs bought from DEC or Data General. It's reminiscent of IBM's loss of "account control" when users started looking at independent tape and disk drives.

- Profitability for IBM plug-compatible peripheral manufacturers declined during 1972, even if accounting changes are discounted. Fundamentally, this drop in margins stems from reaction to IBM price competition as well as increased startup costs for marketing and service operations and the realistic writeoff of R&D over the early years of a product's life. During 1973, however, margins should improve somewhat as larger shipment levels lower the incremental cost of production and field marketing and service operations start to carry their weight.

- Data entry and terminal business should be extremely good in 1973, with sales increases of 40% to 50% being expected. This may sound extremely optimistic, but is possible as smaller companies grow with the tide and build from small bases. All participants in this sector believe it is growing faster than other sectors of the industry, which they peg at 20% to 25% for 1973. Most of the companies talked to have established financial credibility and their officers are beginning to sound more like mature businessmen than the enthusiastic entrepreneurs of a few years ago.

In general, the strongest markets for 1973 appear to be data communications, OEM shipments to producers of small business systems, and data entry products. Industrial control business is also looked upon as a growth area as large users implement significant business expansion plans.

There is a longer range message, however, that can be read into the comments of the respondents to date. Cyclicality in the computer industry is most likely not a one-time thing, especially in purchase oriented sectors. Marketing managers often have short memories, but they had best make a notation of this fact. Not next year, and maybe not the next, but some time before too long there will be another economic downturn. It may not come, as the last one did, right smack along with a major IBM model changeover. And IBM may not again have major changeovers. But hard times will reappear, and a little foresight will go a long way.

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INFOREX STRESSES "FLOAT" REDUCTION WITH OCR-BASED DOCUMENT DATA ENTRY SYSTEM

When Inforex announced shortly after Fall Joint had closed that it had reached agreement in principle to acquire Scan-Data Corp., the rationale for merger was clear. At FJCC, "the nation's leading manufacturer of key-to-disk data entry systems [over 1500 systems worldwide]" had unveiled its "initial entry" into the multi-media device field. The product is an OCR-based system for processing turnaround documents and check remittances.

Called KeyScan, the new system combines optical character recognition, automatic check and document processing, plus operator keyboard intervention. Company spokesmen said this marriage of OCR and key-to-disk technologies will bring major cost savings and operating efficiencies to users of two-way documents. Prospective customers include credit card companies, banks, retail firms, utilities.

Deliveries of the system start during the second quarter of 1973, and the company announced market targets of 36 systems (with up to seven stations each) installed by the end of next year and 175 of the $73,000 systems in place before 1974 closes. Eventually, the company said, the total market for KeyScan could exceed Inforex's success to date in number of systems installed worldwide. Such products will bring much of the growth forecast by EDP/IR (page 4).

Capture data, deposit checks

Inforex stressed that "a significant benefit" offered by KeyScan is reduction of "float," the money represented by customer checks that have been received but not processed for deposit. As soon as incoming mail is opened, an operator can feed turnaround documents into one side of the unit, checks into another. The system optically scans numeric data on the returned document, then the check is automatically MICR enscribed with an amount read from the document or entered by the operator on her ten-key numeric keyboard. A CRT displays scanned data.

During the data entry operation described above, checks and corresponding documents are coded for eventual audit trail accountability, and information is stored on disk for later transfer to tape and other processing. But checks go immediately to the bank.

Two other data entry announcements

In addition to KeyScan, Inforex announced its "In-Line" data entry system, an applications oriented computer system featuring "virtually on-line data processing speed and efficiency at a moderate cost." The 2300, as the new line is called, is "completely compatible with output from the existing Inforex 1301 and 1302 Intelligent Key Entry Systems," but has a control unit that performs a number of additional data entry and control functions.

The "In-Line" system retains as standard all the functions of keypunch, key-to-tape, and key-to-disk. However, it also offers editing checks that vary from table look-ups to field, record, document, and batch integrity tests. Completed data is captured on computer compatible tape that may be entered into a CPU via high-speed tape drives or transmitted via communication features between Inforex systems or directly to and from IBM 360 or 370 computers.

Finally, the company announced an "added values" package for its present 1300 line of data entry equipment. The four new elements are:

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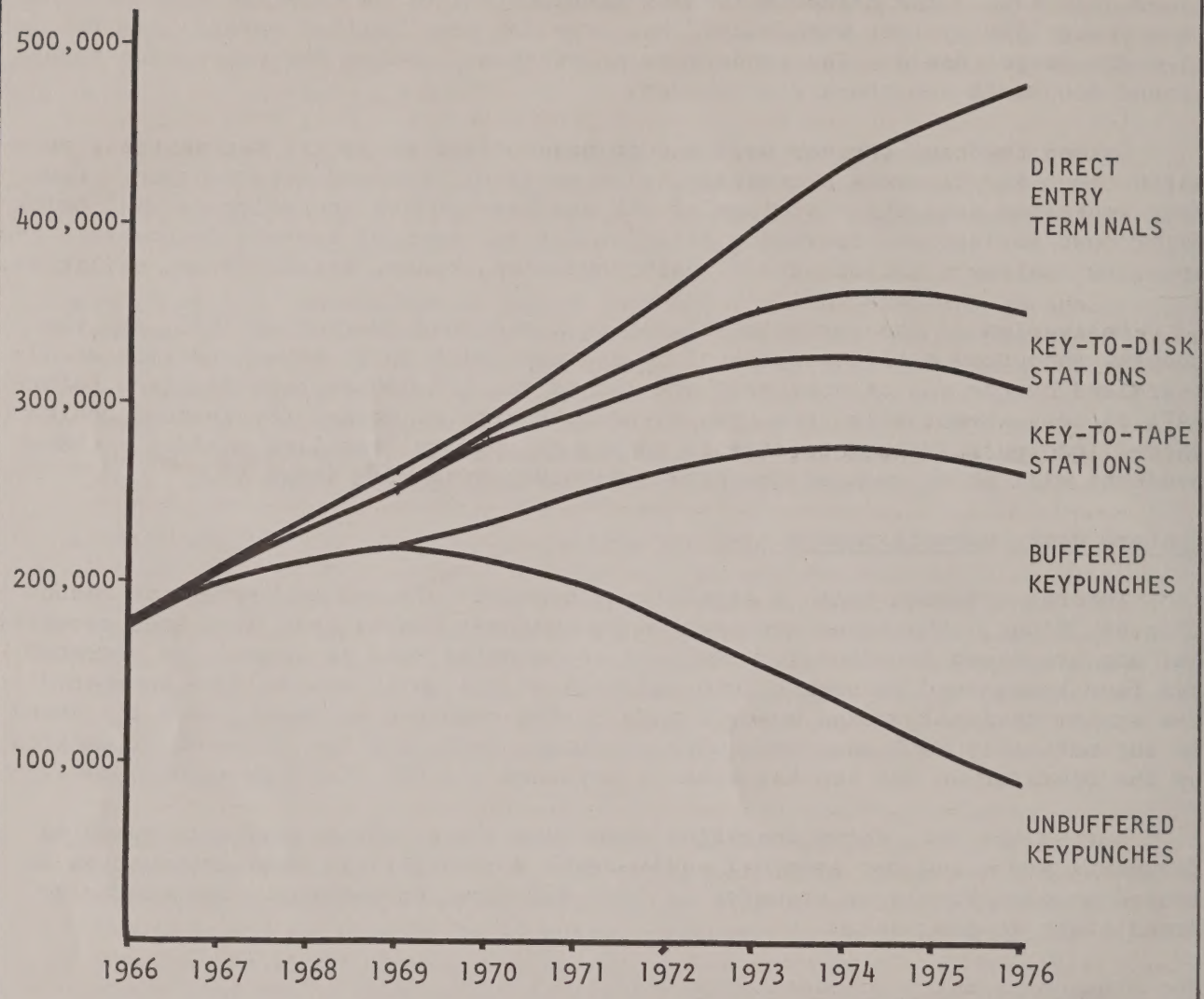
ESTIMATED U.S. DATA ENTRY EQUIPMENT MARKET
Number of Keyboards in Use, 1966 -- 1976
(Copyright 1972, International Data Corporation)



KEYPUNCHES USED WITH COMPUTERS in the U.S. were attacked first by key-to-tape devices, then by shared processors or key-to-disk systems over the last few years. Now, as key-to-tape use has peaked, keypunches will continue to suffer inroads to shared processor systems -- especially specialized types such as the KeyScan announced recently by Inforex (page 2). Additionally, direct data entry devices will soon begin coming on strong . . . reaching some 27% of the installed base by yearend 1976.

Despite all the competition, keypunches will still account for more than half the base of almost 500,000 some four years hence. But most of them will be the buffered variety . . . and manufacturers such as Univac and Decision Data will account for a portion

NOTE: 96-column buffered keypunches -- used with the IBM System/3 and the Burroughs 1700 at present -- are included in the estimates as charted.

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- Virtual program control, a no-cost extra that adds an identifier to each record and simplifies data manipulation;
- System management controls, also free, that do things like count keystrokes or let any station take supervisory control;
- System assistance functions like balance accumulate and compare;
- Model 1402 serial printer that operates at 30 characters per second directly from disk or magnetic tape, with or without editing.

With this stable of new and improved products, Inforex is naturally optimistic about the next year or so. And it hasn't done so poorly during the year that is coming to a close, either. With more than 1000 systems shipped during 1972, Inforex was able to chalk up an increase of more than 100%.

In so doing, the company -- probably more open about its numbers than any in its niche of the information processing industry -- reports it added 250 customers during 1972. But equally important, half its shipments were to existing customers. Thus, as it approaches a more mature position, Inforex is proving itself where it's most important: Any successful company in this industry sooner or later learns that it must continue to derive the majority of its revenues and profits from established customers.

herb grosch, laws of

1. In computing, economy is as the square root of the speed; that is, to do it ten times as cheaply you must do it one hundred times as fast.

2. No one gets a foreign assignment who wants it.

3. Things can get worse without limit.

Dr. Herbert R.J. Grosch, as he was introduced during a panel discussion at the 1972 Fall Joint Computer Conference, is "well known for the widely quoted and almost as widely misinterpreted law that bears his name [1 above]." Also, Herb Grosch is known for his outspoken ability to pinpoint truth, or his version of it, often in somewhat flippant fashion. The latter fact is illustrated in 2 and 3 above, copied verbatim from a note he sent at EDP/IR's request.

Grosch, currently senior research follow at the Center for Computer Sciences and Technology, National Bureau of Standards, often is introduced as the man with the dubious distinction of having been hired and fired by IBM . . . twice! He was described by William Rodgers in Think, "A biography of the Watsons and IBM."

> Besides being a scientist and joining the early colony of IBM men with doctorates, he was the first and only person with a beard hired by the company in Watson's lifetime. To compound matters, achieving more distinction than a man ordinarily pursues, Grosch went into the intellectual circle of IBM scientists twice: first under the reign of old Tom Watson, and second in response to a directive from his heir, Tom Junior -- and was fired both times.

In explaining what inspired the second dismissal, Rodgers attributes a quote to T.V. Learson, now about to leave the helm of IBM, talking to Grosch after a

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newspaper reporter had perhaps misinterpreted what he heard at a technical conference. "What we have to do is find a job for you where you can function accurately and vividly in the IBM Corporation but not see the public."

Apparently IBM couldn't do this. And even the U.S. Government -- where Grosch landed and once headed the center he now operates from -- had to remove most of Grosch's responsibility. But it has continued to keep him around, sort of as a cross between an omsbudsman and a public defender.

He certainly sees the public a lot, and can be found on at least one forum at almost every conference where computers are discussed. And when he's not out stumping -- or on a ski slope getting over a conference -- Grosch says he has plenty of office hours to expound on his theories. Currently, he is suggesting that Justice Department lawyers might at least pay him a visit.

At Fall Joint, Grosch was a panelist in a morning-long session called "Impact of New Technology on Architecture." During his comments, Grosch brought in ideas presented at previous sessions on computers and on "historical perspectives," as well as those about distributed intelligence and LSI minicomputers presented before he was given the floor.

As he made his remarks, Herb Grosch in a very real sense reviewed where the computer industry is, and where it is going . . . a la Grosch. EDP/IR considers this view important as well as occasionally witty, and presents below most of Herb's comments at the session. Only the headings have been added to identify the subjects.

Computers for the masses? This whole thing has given me absolute shivers. Here are these mad tool artists, running around looking for something to make. This scares me . . . scares me something awful . . . because I've been doing this for twenty/twenty-five years. The first few years there were all these problems lined up at the factory waiting for the tools. And it was a long wait in some cases, believe me . . . unless you could pick your own toolmaker.

Now, all of a sudden, the tools are flooding about. All these nutty designers are making minis, micros, micro-micros, sub-micro-micro computers, and they are scouring the face of the earth to find something to do with each one. Now I don't mean there aren't going to be some decent customers, fellows. Take heart! There are indeed a few people who need a hand-held Univac. But don't plan to go into mass production.

Hewlett-Packard, I think, is making a gorgeous little toy for us . . . what a thrill to have a ten-place slide rule! But, you know, the slide rule market is limited. And the toy aspect, I don't think, is exploitable except, perhaps, by a new department of F.A.O. Schwarz.

NOW LOOK. Drop all this technological crap, if you will pardon my frankness. There is a good share of equivocalness in our business, gentlemen. In the first place, we aren't in a science . . . we aren't in a technology . . . we're somewhere between a trade and a racket!

Professionalism? You all know the most important aspect . . . the key factor . . . in this whole thing is salesmanship. The trick is to force the poor stupid consumer to take what we make. Not to make what he needs. There'd be no business in that. And definitely no profit.

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And the second influence is the overweening professionalism of the people represented in this room. We've got that great Western syndrome -- if you can, you should. We can build a Univac on the back of your thumb. So of course we must go into mass production immediately! Maybe you don't even need a full-sized Univac . . . you certainly don't need one on the back of your thumb.

Brush it aside, fellows. We're professionals. Our business is to make them smaller, faster, and harder to get at!

How small is big? You've heard speakers saying that it's very hard to define terms like minicomputer, desk computer, larger computer, supercomputer. Why? You know. The power . . . the technology . . . changes so rapidly. There's no question about it. Since I first managed computer installations, we've gained more than 10 to the 8th power in speed alone, more than 10 to the 10th power in on-line capacity. We've even gained ten to the first or second power in reliability.

It's very true that technology has swept past on technological definitions: How many tubes, how many chips, make a microcomputer, or a supercomputer?

But there's another thing that hasn't changed much at all. That is the first influence in our business. Salesmanship! Money! Profits! And so forth. So I say that we really haven't changed more than perhaps a factor of two in that parametric description of what's a big machine and what's a small machine. Let me read you my current divisions using that parameter, money:

A microcomputer costs less than $8,000;
A minicomputer costs less than $40,000;
A small computer costs less than $200,000;
An ordinary or regular computer costs less than $1 million;
A large computer costs less than $5 million;
A supercomputer costs more than $5 million.

And . . . these definitions aren't going to change by more than a factor of two in the next ten years. WRITE THEM DOWN. Use them!

The next time somebody says "Is that a microcomputer?" ask how much does it cost, not how many chips are in it, or whether it's got the capability of Sage. Sage didn't work either. It certainly didn't have a real problem that it had to solve. Sage was a way that we defended the country when it was not under attack in a different way that it's not under attack today.

LISTEN. This business about the high-school-dropout-bookkeeper programming a hand-held Univac is for the birds. Sure, they can punch the buttons on a normal adding machine. But you're going to force them to buy a $50 Univac. How the hell are you going to teach them to program it? You've got to go back to your closed shop, fellows. You've got to do that first to use a hand-held or any other sized Univac. Dropping the price is not a solution.

Timesharing . . . virtual storage . . . and networks. There's no question that all manufacturers are fully aware of how to rip off the customer. The others weren't when they started. It was sheer professional enthusiasm on the part of certain people that inflicted things like Fortran on us. But General Electric, for example, caught on very early to the reality of timesharing . . . and what a great way it was to waste computer power!

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And virtual storage -- both at Burroughs and ten years later at IBM -- is a conscious attempt to screw up the customer.

And networks -- my oh me oh my! The very thought of all these people trying to put hundreds and hundreds of thousands of dollars worth of communications boxes -- all centering down on this $50 chip -- and then tieing a hundred thousand of them together so as to get you back to one Texas Instruments ASC [Advanced Scientific Computer]. Great! Great! That's the way to really do it. Last night's moderator said it would be fun to have a microcomputer in every home. I say it won't be more fun than television until they have a lot easier access to the push buttons than we have at the present time.

IBM? Will IBM merrily bury the rest of us someone just asked? I don't want IBM to bury anybody. I'm struggling like mad against them. I'm jumping up and down, undressing in public, travelling to Siberia trying to stop them. But, yes. I think they probably will. If it's any consolation, I think Burroughs will probably survive XDS, National Cash, and probably CDC.

On Grosch's Law. I was serious about insulating the user from the power of the system. Fellows, even if Grosch's law is requiring all that great capacity . . . all that great distance of access . . . that great reliability . . . all in the support of speed. And even if the square root is optimistic, the fact remains that we ought to be doing things ten thousand times cheaper than we were back in the punched card days. And we aren't. It still takes all morning to run a payroll. Sure, maybe it's ten times cheaper. It sure isn't ten thousand.

Supercomputers. There's no question that modern algorithm compression for array computers will certainly be useful for meteorology, possibly for cryptography, for celestial mechanics, and other large-scale computer applications like that. These are cases where you spend a great deal of time making the logic program more efficient and then you run it over and over and over again.

But that's not the problem most of these people are talking about. They're only going to do most of their problems once. And you can't afford to do all this or any other kind of optimising if you are going to run it once. Not even if you are going to use a hand-held Univac to run the test program.

Software. Consider the $5,000 minicomputer. It takes $300,000 worth of programming to make it run! But I ask you. What if he possibly had a somewhat larger machine and a somewhat better understood machine with a somewhat more flexible operation code and so on. Wouldn't he reduce his software costs more than he increased his hardware costs. I'm certainly in favor of putting these machines down inside of sheet rock presses and infrared spectrometers and other dedicated applications. But don't keep programming them.

One last comment on the software problem. Of course, my theory is that almost all the tricks that the manufacturers have used to keep you from actually getting at the power of the machine have been software tricks. But as far as the software experts are fighting back . . . or the customers, even sophisticated users, are fighting back by doing better software, we heard it reviewed last night. The speaker got up and said we have made no advances in software technology since the term was invented. CORRECT. We haven't! We have simply learned how to screw people with it but we have not learned how to do it any better. I think that's about it. Thank you very much.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" DECEMBER 29,1972 o VOL.8,NO.5 P.J.McGOVERN,EDITOR

Off the plateau . . . and up

SHIPMENTS BY U.S.-BASED MANUFACTURERS TO EXCEED $9 BILLION IN 1972; PRELIMINARY FIGURES INDICATE 1973 AND 1974 WILL HAVE MODERATE GAINS

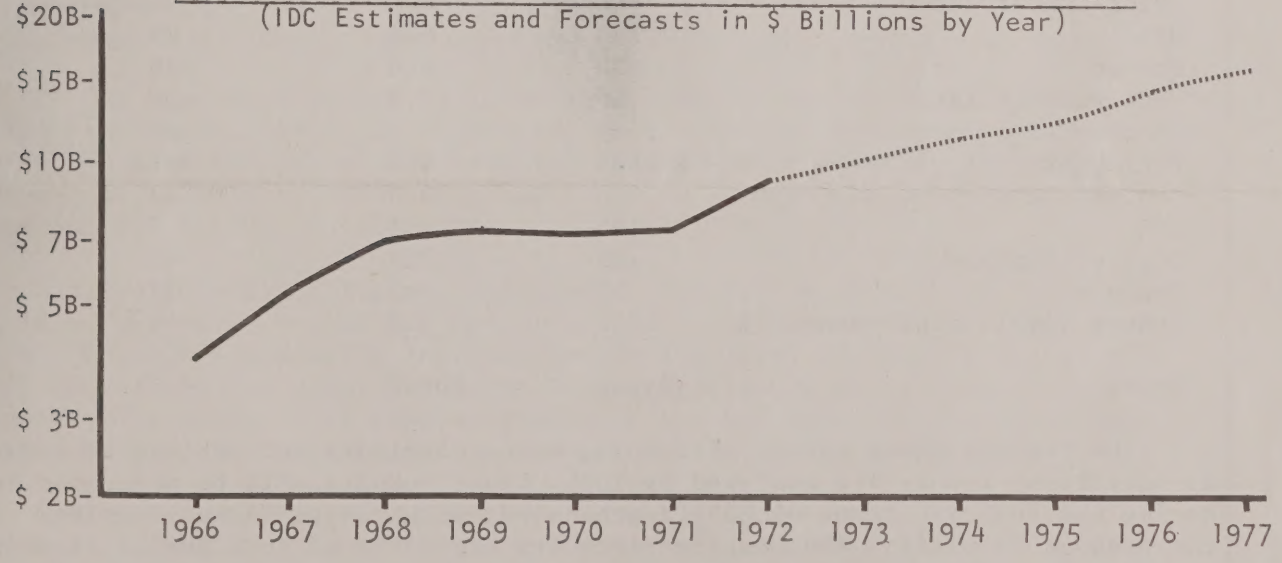
Some fine tuning will change the decimals, but there's no doubt about it! Shipments of computers by U.S.-based manufacturers haved moved off their $7+ billion plateau (see chart, below) to somewhat above the $9 billion level for 1972. This increase of 25% or more is final evidence that the computer industry is out of its doldrums. What's more, all the evidence available to the International Data Corporation, publisher of EDP Industry Report, indicates that at least two more healthy if not booming years are in store for the computer industry.

The bubble of oversell generated in the mid-to-late 1960s in the U.S. has finally been cleared from the pipeline. As a result:

+ The heavy wave of retirements has finally slowed as users begin to implement new and well-planned applications (see page 3);

+ The international marketplace will hold steady in importance, accounting for only about 40% of U.S. company business for a few years.

WORLDWIDE SHIPMENTS OF COMPUTERS BY U.S.-BASED MANUFACTURERS
(IDC Estimates and Forecasts in $ Billions by Year)



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In a very real sense, the international portion of the market for U.S.-based manufacturers has been moving along smoothly . . . with bad economic conditions in one country more or less offset by good times in another . . . with user demand playing a much more important role than salesmanship. There never has been the capacity buildup brought on by oversell and keeping up with the Joneses.

In the U.S., however, overcapacity was a very real factor as the 1960s came to a close and a period of poor economy set in. Users, in many cases, made do with what they had or sidegraded to more efficient equipment. The result was a matching of demand to capacity . . . at the expense of shipment growth. Now, however, a new period of demand has started.

The transition to orderly growth throughout the world, in fact, causes lots of little oddities to pop up in the numbers. To EDP/IR, however, these really are indicative of a return -- at long last -- to some sort of norm, as it were. In some cases this norm existed before; in others, it is finally emerging as the mainframe portion of the computer industry begins to act with a little of the maturity some observers think it has acquired. These factors will be explored in greater detail when the 1972 numbers are finalized.

IBM paces shipment growth

IDC's preliminary figures, however, show without question that 1972 will stack up as one of those growth years reminiscent of earlier times in the computer industry. The catch, of course, is that this is the first real growth year for computer shipments since 1968. Anyway, IBM set the pace, as expected (EDP/IR Mar.30,1972).

PRELIMINARY ESTIMATE OF 1971 WORLDWIDE COMPUTER SHIPMENTS
(Values in $ million for U.S.-based manufacturers)

Company	Shipments	% of Total	1971-72 % Change
IBM	$6,110	66.9%	+34%
Plug-Compatibles	440	4.8	1
HIS	750	8.2	29
Univac	420	4.6	26
RCA product line	60	.7	-50
Burroughs	$ 405	4.4	+ 6%
Control Data	210	2.3	12
NCR	195	2.1	5
Digital Equipment	185	2.0	45
Xerox	50	.5	17
Others (incl. minicomputers)	315	3.5	41
TOTAL	$9,140	100.0	+27%

The figures shown above, of course, are preliminary and subject to revision as additional inputs are analyzed by IDC. Final results will be presented in the Review and Forecast issue of EDP/IR scheduled for March, 1973 publication. But the message is clear: The computer industry has returned to a period of shipment growth. For 1973 and 1974, IDC is forecasting shipment growth rates of 10% or more each year -- with less netting out of retirements. Thus, several years of 15% growth in installed base seem quite likely.

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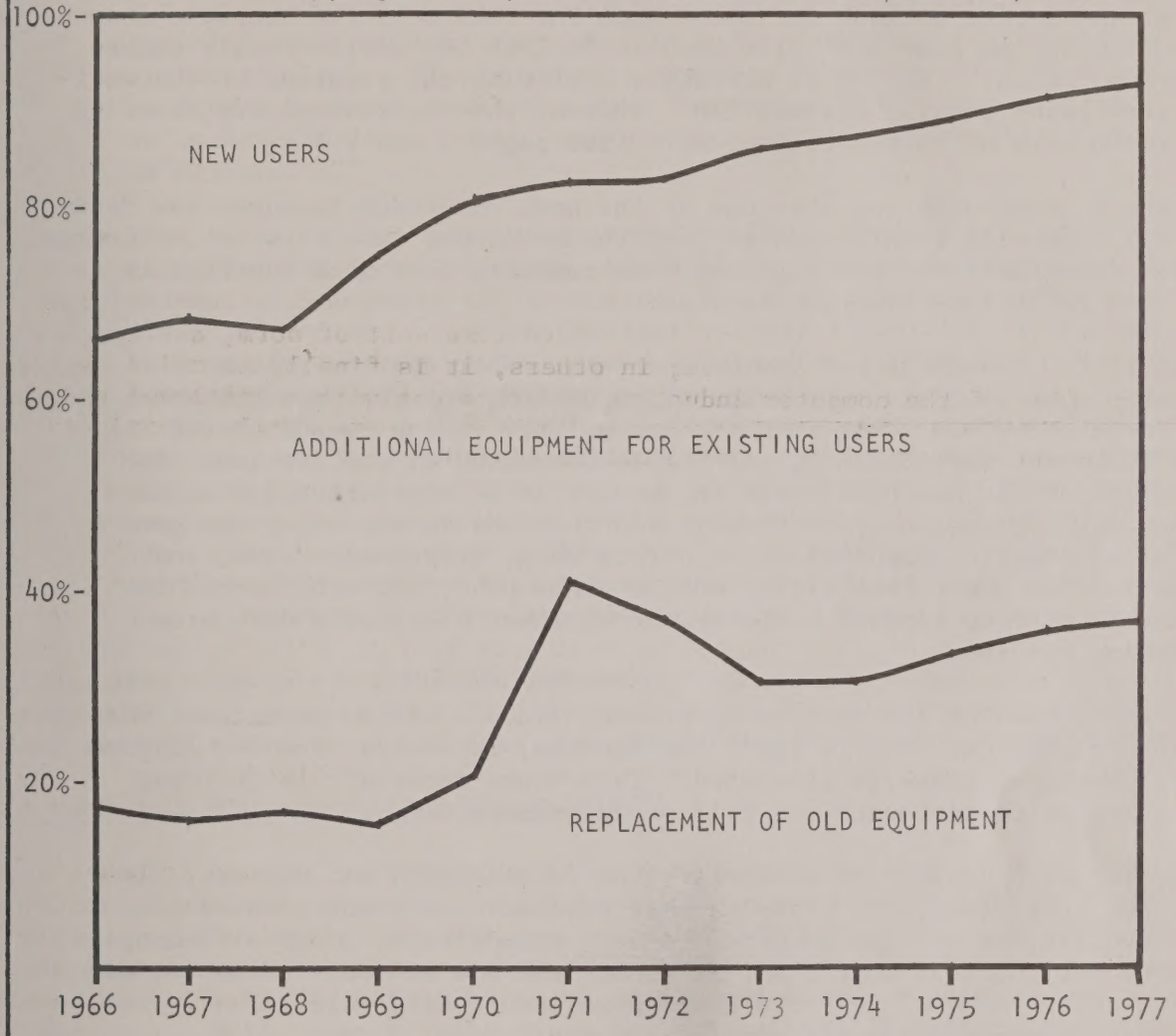
WORLDWIDE SHIPMENTS OF COMPUTERS BY U.S.-BASED MANUFACTURERS
Per Cent Distribution by Value: 1966 - 1977
(Copyright 1972, International Data Corporation)



THE NETTING problem referred to so often by IBM during the last few years is illustrated above. Also, as indicated, this situation is expected to moderate. During the next few years, IDC expects replacement of existing equipment -- another way of talking about retirements -- to be much more orderly, and account for 30% to 35% of shipments.

Outside the United States, replacement has been much orderly -- reflecting less "oversell" -- and has held level at the 25% rate for the last several years. This will gradually increase to the 30% level during the years indicated above. In the U.S., the bulge to over 50% seems to be a one-time phenomenon. The current 30% rate will grow to the 40% level as the latter part of the 1970s -- and an expected new round of mainframes -- approaches.

New users continually account for a smaller portion of shipments. This is a simple fact of life in the computer business, because 1) the bulk of organizations capable of using computers economically already has them and 2) computers for small users are growing less expensive year by year, and no end to this is in sight.

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On the legal front

SOME BIG-THINK IDEAS TO KEEP IN MIND WHEN SECOND-GUESSING THE COURTS

It's harder and harder to look far ahead into the future of the computer industry without injecting some qualifier such as "unless the courts really change all the ground rules." EDP/IR is certainly following the progress of the various antitrust cases pending against IBM. Indeed, the proceedings are starting to bring forth lots of interesting items. (See pages 5 and 6.)

And there is no question that one of the most important business law decisions of all time will finally emerge from the antitrust cases now in the courts. IDC's legal department has put together some comments that seem appropriate to share at this reflective time of the year.

- The facts themselves are quite uncertain. What are the relevant facts, what companies are competitors of IBM, and what are the markets in which IBM is or is not a monopolist? These questions are of fundamental importance, yet highly contested by the parties. IBM claims, on the one hand, that the market it's in practically includes people who count on their fingers and toes and in any other way perform arithmetic computations. Control Data, Greyhound, Telex, and the Justice Department claim, on the other hand, that the market is general purpose digital computers or at least electronic data processing machines.

- Determination of IBM profits by product line or within particular markets is complex. How is IBM's R&D expense, marketing expense, or general overhead properly allocated? This seems necessary in deciding whether price discounts are fair or anti-competitive.

- The law with respect to monopolization is uncertain and unclear. It is far from clear, for example, what procedures a company which is a monopolist may utilize in order to meet competition. Most old monopoly cases date back 30 years, and it is unclear how to apply these or, more particularly the 82-year-old Sherman Antitrust Act, which clearly reflects economic theory of a different age.

There are also broader factors . . . considerations that may not be very legalistic, but considerations that seem certain to play a role in the outcome of some if not all the cases now pending.

- The Justice Department case is being tried before Judge Edlestein, very eminent and very experienced. He heard the 1952 Justice Department case against IBM, approved the 1956 Consent Decree, and has supervised its enforcement and compliance. He is thoroughly familiar with IBM, knows more about the EDP industry than any other Federal judge, and surely recognizes the present case not only as the largest of his career but probably the last big one. If he is going to leave a mark in the legal volumes reporting Federal court decisions, it might well be in this case.

- For the first time in 1971, more than half of IBM's earnings came from outside the U.S., and therefore IBM is a major contributor to a favorable balance of payments. As such, IBM also is the beneficiary

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of current economic thinking that suggests that in an international economy, U.S. companies must be permitted to acquire the size and financial resources that will keep them effective compatitors. IBM's European competition is from companies that are relatively free from U.S. antitrust constraints, and its competition elsewhere will be from Japanese manufacturers who, by U.S. standards, are practically all monopolists. Thomas Kauper, new head of the Justice Department's antitrust division, recently said "as we get firms that are reacting on an international basis, our precept as to what competition really is may change."

- Then there is the continuing change in IBM's product mix. IBM's share of market has been declining, although it remains substantial. And in another two years IBM's sale of CPUs will represent less than half its total income. For the remainder of the 1970s, IDC sees a continuation of the already visible trend toward what EDP/IR calls distributed computing. This involves the use of information appliances, the access to data processing equipment at increasingly lower levels of all organizations, and by decentralized computing. As a result, the terminal -- input and output equipment -- will become increasingly more important as central processing units play a decreasing role. This trend means that other companies -- perhaps even minicomputer or peripheral equipment manufacturers -- will become more competitive with IBM as marketing opportunities shift from the center of systems to the periphery.

Thus, the items now represented by pending litigation become less and less relevant with each passing year, and by the time the current cases finally wind their way through appeals and the like, the decisions may be more academic than real.

A HAND-HELD HEWLETT-PACKARD IBM MACHINE?

At a recent hearing before Judge Edlestein, IBM introduced Richard Case, its director of advanced systems, "which is the department within IBM which is charged with . . . developing the next generation of IBM EDP products." He began explaining to the court how computers work, and first demonstrated a mechanical adding machine built by the Odhner Corp. of Sweden and based on patents more than 150 years old. Next, Case brought out a Hewlett-Packard 35 "electronic slide rule."

Third, Case displayed an IBM laboratory machine he described as an "electronic notebook." He qualified this exhibit by saying it is not currently offered for sale or use, but is "representative of the kinds of things which may be offered by us or others very shortly . . ."

The device, Case said, is "similar in appearance to the HP 35 calculator we looked at. It has a numerical keyboard . . . some function keys . . . the same sort of light-emitting digital display." But, the machine also has "a very substantial amount of internal storage . . . 10,000 or more digits in a semiconductor memory all contained within the device." Using the machine at a warehouse, Case said, an operator might record shipments and receipts of goods. Then, at the end of the day, the device could be plugged into a telephone line for transmission of data . . . or hooked onto a printer for a listing. It contains a "somewhat modifiable" and "significant" program provided by the manufacturer.

It sounds to EDP/IR like a pretty sophisticated example of an information appliance . . . any questions?

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WHAT EVIDENCE CAN WHO USE IN WHICH IBM CASE?

Shortly before Christmas, a U.S. Court of Appeals tossed out a pre-trial order made during September by New York Chief District Judge David N. Edelstein, the man in charge of hearing "United States of America v. International Business Machines Corporation."

The question was whether some 1,200 papers among millions microfiled for the Control Data v. IBM case in Minneapolis could be introduced by Justice. IBM said it had let a few "priviledged" papers slip through; Justice Department lawyers said too bad, but now they are in the "public domain." In taking another look, the Government asserted, IBM was removing too many juicy items.

The Appeals Court said that a judge or special master should rule on the disputed documents before they are handed over to the Government.

An example of the type of information the Government wants to introduce was presented in a supporting memorandum filed with its request and reproduced below from the Government's transcript of a word-for-word voice recording. This Faw Memorandum, so-called (Hillary F. Faw, IBM Director of Business Practices in November, 1969) was found in the files of R.A. Pfeiffer, then IBM Director of Marketing and now head of the Data Processing Division.

HAF 11/21/69

Thoughts for Consideration

The liability of IBM's risk lease is dependent on price leadership and price control.

By means of price leadership, IBM has established the value of data processing usage.

IBM then maintains or controls that value by various means: timing of new technology insertion; functional pricing; coordinated management of delivery; support services and inventory; refusal to market surplus used equipment; refusal to discount for age or for quantity; strategic location of function in boxes; "solution selling" rather than hardware selling; refusal to support subsequent user hardware, etc.

Unbundling has created a new threat to IBM's price control.

By eliminating fixed price solution selling of hardware eventually leading to increased price competition.

Functional pricing already under pressure because of OEM activity. Unbundling will increase that pressure.

Equalization of subsequent use adds value to existing third party inventories.

Seriously reduced capability to maintain [couldn't decipher] ahead of supply.

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Legal problems are emerging as a result of certain practices which are key underpinnings to price control.

Refusal to market used machines and parts.
Refusal to sell bills of material.
Maintenance parts prices.

The key underpinnings to our control of price are inter related and interdependent. One cannot be changed without impacting others.

These interrelationships are not well or widely understood by IBM Management. Our price control has been sufficiently absolute to render unnecessary direct management involvement in the means,
[the next five or so lines were deleted from document]

The D. J. Complaint specifically covers varying profit margins and an intensive investigation of this issue would reveal the extent of our price control and its supporting practices. Such a revelation would not be helpful to our monopoly defense.

If IBM's price control is seriously threatened, either from the market (because of unbundling) or from legal exposure (because of the supporting practices) or from the D. J. (because of demands for remedy) it is necessary that IBM Management fully understand its import in order to decide.

Negotiations' strategy with D.J.

good vs. bad practices remedies
good vs. bad structural remedies (or)
decision to litigate.

Pricing Approach to New Systems.

Reduction of Legal Risk relating to practices.

Recommendation

Assemble a small, knowledgeable, secure group to think through these issues, particularly in their interrelationships -- define the emerging environment and the various new forces which indicate significant new change -- and map the rudimentary elements of strategy or alternative strategies for consideration by Management.

In the memorandum containing this document, Justice Department lawyers stated "the fact that the document is highly relevant but apparently in no way privileged gives rise to an inference that its attempted suppression in the Control Data case, and IBM's refusal to deliver it . . . were motivated by the practical consideration of keeping relevant, useful documents out of the opponents' hands as long as possible and at the same time obfuscating and delaying the private proceedings by strategic use of the claim of privilege."

The document is in the public record, although it may be barred from consideration by the recent ruling. No matter, EDP/IR finds it highly interesting.

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NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

ABATRONIX INC.	Abatronix, Inc., 342 Madison Ave., New York, N.Y. 10017, a recently organized manufacturer and marketer of electronic calculators, filed to register 100,000 common shares to be offered at $6 per share. Underwriter is Kordich Victor & Neufeld, 40 Exchange Pl., New York.
BURROUGHS CORPORATION	Burroughs Corporation, Burroughs Place, Detroit, Mich. 48232, registered 102,852 shares of common stock issuable upon conversion of the 3-3/4% convertible unsecured loan stock 1977/82 of Burroughs Machines Limited, a wholly owned subsidiary.
COMPUSIZE INC.	Compusize, Inc., 245 Livingston St., Northvale, N.J. 07647, a company making dress patterns by computer for use in the home sewing and commercial apparel markets, registered 383,333 shares of common stock for working capital and other purposes. The stock at $7 per share offered by Denis McCauley & Co., Inc., 730 Second Ave., Minneapolis, Minn. 55402.
DATATROL INC.	Datatrol, Inc., Kane Industrial Dr., Hudson, Mass. 01749, seeks registration of 250,000 shares of common stock at $10 per share maximum. The company supplies computer-controlled data entry and information retrieval systems. Underwriting group is headed by Breck, McNeish and Nagle, Inc., Three Center Plaza, Boston, Mass. 02108.
GENERAL AUTOMATION INC.	General Automation, Inc., 1055 So. East Street, Anaheim, Calif. 92805, the minicomputer systems manufacturer, filed for registration of 420,000 common shares of which 255,000 are to be offered by the company and 165,000 by selling stockholders. The underwriters of the issue are Reynolds Securities Inc., New York and Bateman Eichler, Hill Richards Inc., Los Angeles, and proceeds are for debt repayment and working capital.
GENERAL SEMICONDUCTOR INDUSTRIES INC.	General Semiconductor Industries, Inc., 230 W. 5th St., Tempe, Ariz. 85281, a manufacturer of electronic components and circuits, filed to register 120,000 shares of common stock to be offered for sale at $6 per share. Of the net proceeds, $300,000 will be used for capital equipment and the balance for working capital and other purposes. Underwriters are headed by J.D. Winer & Co., Inc., 5 Hanover Sq., New York 10004.
HARRIS-INTERTYPE CORPORATION	Harris-Intertype Corporation, 55 Public Sq., Cleveland, Ohio 44113, filed a registration statement on covering 247,425 common shares issuable upon conversion of $15 million of 5% convertible subordinated guaranteed debentures, due 1972, of Harris International Finance N.V., a wholly-owned European subsidiary.

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"THE GRAY SHEET" JANUARY 19,1973 • VOL.8,NO.6 P.J.McGOVERN,EDITOR

Comprehensive index tape erased

FOUR-YEAR-OLD ANTITRUST SUIT SETTLED AS CDC BUYS SERVICE BUREAU CORP. FROM IBM

When the surprise settlement to Control Data Corp.'s antitrust suit against IBM was announced at the start of business on Monday, January 15, the general consensus among Wall Street and computer industry observers was that CDC had won . . . something. In the settlement package hammered out along unexpected lines during hush-hush negotiations over the last year or so, CDC essentially decided to let the Justice Department worry about IBM's marketing practices; the mainframe challenger settled for a business-oriented package in which IBM

- sold Service Bureau Corp. to CDC, thereby boosting CDC into the Number One position in computer services;

- agreed to pay CDC upwards of $100 million over the next ten years;

- provided for patent cross-licensing with CDC until mid-1968.

So the big question in some minds was exactly what led IBM's Chairman and Chief Executive, Frank T. Cary, to comment:

> *I'm gratified . . . this suit has represented a significant and growing expenditure of management time and legal expense. This settlement is timely and conclusive and it gives fair value to both sides.* [Emphasis added]

By weeks end, however, the picture became somewhat more clear as to what IBM's "fair value" might be; words connected with the settlement took on fuller meaning. In a three-page letter to CDC shareholders mailed the afternoon of the announcement, William C. Norris, CDC President, said:

> *Since we have settled our case we have, as is customary, discontinued our efforts toward preparing for trial and our attorneys have disposed of their work product.* [Emphasis added]

In plain English, this turns out to mean that an extensive index to the 27 million documents collected for the case has been destroyed. Fittingly, it seems, the index had existed only on magnetic tape, and the tape was erased.

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Word of this destruction -- seemingly as effective and far more eloquent than a paper shredder or the like -- came to light when Telex, due to begin trial of its antitrust case against IBM in April, went to the St. Paul Court and asked that the settlement be held in abeyance until CDC and IBM reestablish the index. It's destruction, the Telex motion says, "was induced by IBM and undertaken by CDC in connivance with IBM . . . as a condition of the settlement . . . for the purpose of depriving Telex of the use of said data base or index." A hearing on the Telex motion has been scheduled for January 26.

CDC says it has no present obligation to Telex, feels the motion is without merit, and will argue this position in court next week. The index, it says, was prepared by lawyers and really represented judgement and analysis upon which CDC was basing its case. So, since the case was over -- dismissed "with prejudice" [an agreement that all claims would never again be brought up by CDC or IBM] -- CDC no longer needed its "work product," the index on magnetic tape.

Telex claims that a pre-trial order issued last year in connection with the consolidated proceedings required CDC to make available the index as well as the millions of documents, which are still available.

And the Justice Department is yet to be heard from. Much of its antitrust suit against IBM -- filed four years ago this week -- has also been based on the tons of evidential material collected by Control Data. So, perhaps Norris' comment about this -- contained in the same paragraph of his stockholder letter that contained the oblique reference to the tape erasure -- is worth a look:

> *While we will no longer be providing assistance to the government in bringing its case to trial, we will continue to advocate the relief which we believe should be obtained for all segments of the industry by the government's case. The settlement of our case could enhance the acceptance of the relief plan we submitted* [see box, page 3] *since it eliminates the appearance that we had an axe to grind in our own case.*

"Instant" leader in computer services

CDC's Norris, in expressing his gratification at the results of the settlement, stated that his company "will achieve substantial long term benefits from all these transactions." These include a package in which CDC gets:

- Cash to the tune of $15 million as "reimbursement . . . for expenses, including legal fees." By EDP/IR's estimates, this clearly exceeds what CDC has spent on legal expenses, probably pays for developing the index that has been destroyed, and is about twice CDC's pretax profits from 1972 EDP operations.

- Service Bureau Corp., at what looks like a bargain price. CDC pays $16 million for an operation that last year earned $1.5 million on revenues of $63 million. In addition, CDC gets $2.6 million for each of the next ten years to pay for retirement and other fringe benefits of employees (almost transferable to profits) and a contract for IBM business worth about $5 million a year for five years.

- Research and development contracts worth about $6 million a year for the next five years, with rights to use and/or license to others the technology developed. Magnetic storage is one area to be investi-

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CDC'S PLAN FOR NON-PUNITIVE RELIEF

Speaking at his company's annual meeting last May, Control Data President William C. Norris pointed out that there is considerable public discussion of breaking IBM up or providing other suitable relief from its domination of the industry. To offset "some extensive IBM propagandizing," Norris offered some comments, from which the following is taken:

> Breaking IBM into two or three companies would not solve any of the industry's problems but would only aggravate the effect of IBM's practices.
>
> Breaking IBM into a large number of companies, each viable but without the means to annihilate its competitors, is technically feasible but, we fear, a political impossibility.

Thus, while Control Data has given this method of solving the problem a great deal of careful study and has evolved what we believe is a workable plan, we do not believe that industry should rely on that approach and therefore have developed alternatives for restoring competition to the industry.

We feel that it would be possible to restore competition if unfair marketing practices in the computer systems market were prohibited and if IBM's dominance of the rapidly growing complementary markets were prevented. One significant defect of the 1956 Consent Decree between the Justice Department and IBM was that it was not forward-looking and did not take into account the significance of the emerging complementary market, at that time computers. The growing complementary markets today, and the ones in which it is necessary that IBM's dominance be curtailed, are:

= semiconductors and components;
= data centers or service bureaus and timesharing;
= professional services and education;
= remote terminals and communications.

In these areas we do feel that some form of divestiture or curtailment will be required.

It seems to EDP Industry Report that a portion of this has been accomplished through the settlement with IBM.

> gated, but the other three -- terminals, transaction-oriented software, and data services networks -- look to be of much more value to CDC than to IBM because . . .

. . . Control Data also gets clear sailing in the services area. As part of the settlement package, IBM has signed an agreement "not to engage in the data services business in the United States for six years."

The significance of this settlement on the computer services industries cannot be overlooked. It begins to bring a little form to a leaderless and heterogeneous environment (EDP/IR Sept.15,1972) . . . especially in the light of General Electric's efforts (page 5). Without question, CDC now becomes the leading services supplier -- with only 7% of the $1.5 billion 1971 revenues:

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LEADERS IN COMPUTER SERVICES
(Copyright 1973, International Data Corporation)

Company	1971 U.S. Revenues	% Total Services Market
Service Bureau Corp. (IBM)	$ 70 million	4.9%
General Electric	60	4.0
Automatic Data Processing	45	3.0
McDonnell Douglas Automation	35	2.3
University Computing	33	2.2
Control Data	32	2.1
Statistical Tabulating	30	2.0
NCR	25	1.7
Bunker Ramo	24	1.6
Sub-Total	$354 million	23.6%

CDC points out that the acquisition of Service Bureau Corp. is desirable because of "the growing importance of data services to Control Data's total service approach to the solution of customers' problems." It also looks forward to the potential of a more stable earnings growth as compared to the feast or famine nature of the large scientific mainframe business. SBC, Norris points out, fits nicely with the current Cybernet services:

- Individual segments of CDC's data services businesses -- such as timesharing, local and remote batch, and transaction-oriented software -- will operate at more balanced levels.

- There is a relatively small amount of overlap in the type of applications processing offered by SBC and Cybernet.

- The basic customer profile, however, "is quite similar as to size and nature of corporations served. This means in combination that we will offer more complete service or 'product line' to all customers," and will be in a better position to broaden the customer base by offering services "to the huge number of IBM computer users."

- Economies of scale -- such as sharing communications costs -- will benefit both operations. And, "the addition of SBC will approximately double our number of salesmen knowledgeable in services."

CDC has at least some experience in merging a service operation, since its present service includes much of what was C-E-I-R, Inc. prior to its 1967 acquisition. And it should be able to operate SBC at more of a profit than previously possible by IBM. In addition to the prepaid retirement and benefit expenses, CDC gets all of SBC's computers -- primarily 360/20s and 30s -- rent free for six months. By then, it plans to reduce rental payments, either by converting to purchase or by obtaining third-party leasing arrangements.

Fair value to both sides?

As EDP/IR concludes this initial look at the IBM-CDC settlement, we must turn again to Cary's statement. It's obvious from the above that CDC won a good deal; we can understand Norris saying: "The decision to file a lawsuit in 1968, although difficult at the time, has now proved to be one of the best management decisions in our history."

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For IBM's part, it has pulled out the second biggest thorn in its side, and the cost probably isn't considered extremely high in the IBM numbering system. Service Bureau Corp., from its very creation under the Consent Decree of 1956, has always played a second-fiddle role within IBM, and industry talk is that IBM more than once before has considered getting rid of this service operation.

The R&D contracts might be beneficial to IBM, but they are pretty clearly a form of compensation for past transgressions. In combination with the six-year moriatorium IBM declared on the service business in the U.S., these go a long way toward allowing CDC to "catch up" in the marketplace . . . if it has the talent.

And the very fact of this settlement clears the air for progress along other fronts. A Telex settlement along the lines established with CDC -- reimbursement for expenses plus some sort of curtailment on competitive activities -- wouldn't surprise EDP/IR. The lack of an index to the CDC collection of IBM documents might serve to speed up matters on this front.

So the suit pending with Justice is still the biggest unknown. The betting all along has been for some sort of consent decree, and IBM's willingness to curtail its future in a "growing complementary market," as CDC's Norris so aptly describes the situation, might mean that the shape of a new consent decree is taking form. More than one observer has suggested that any meaningful restraints on IBM will have to look to the future, not the past.

GENERAL ELECTRIC FILLS IN THE SERVICE GAPS FOR BALANCED CUSTOMER MIX AND WORLDWIDE LOAD

During the first two weeks of 1973, General Electric was the largest supplier in the computer services industry. Service Bureau Corp., the 1971 leader (see table, page 3) had a revenue drop of about 10% in 1972 to the $63 million level. And GE's Information Services Division continued on its growth path to something above that mark.

The rankings changed again this week, of course, when Control Data bought SBC as part of its antitrust settlement with IBM (page 1); GE clearly drops back into the Number Two position among all computer services suppliers. But GE's ISD is moving forward on plan . . . around the world and across the $2.2 billion computer services matrix EDP/IR forecasts for 1973. CDC, on the other hand, has its work cut out if it is to achieve the level of network service and sophistication GE has built to springboard its service operations.

Growth with an eye to profits

GE was one of the first companies into timesharing, haven taken advantage of development work at Dartmouth College in the early 1960s. By the time GE sold its computer interests to Honeywell in 1970, its Information Services Division was the leading supplier of rair computer services, and ISD was retained. Since that time, GE has been expanding both the types of computer services it supplies, and the geographic coverage. Balance on both counts is important for a computer services operation to be profitable (EDP/IR Sept.15,1972).

Simply turning the corner into the black isn't proof positive of long-term profitability -- especially in the volatile timesharing side of the services business -- but GE's ISD activities over the last several months demonstrate significant efforts that should stabilize the profitable position the company

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has attained. It recognizes two important factors in a service business operation -- keeping costs at a minimum and maximizing revenues per dollar invested:

- A major item in a service company's budget is sales cost -- so important, in fact, that some firms amortize them. The cost of adding each new customer, training his personnel, and providing software development assistance is enormous. And there's no guarantee that a customer will stay on board very long; the next vendor may offer a lower price, and off he goes in a cloud of dust.

- Increasing revenues proportionate to investment requires finding some means of using the large amounts of network capacity that sit idly by during off-peak hours.

GE appears to have found relatively successful ways to do both things, but even it has a long road to hoe in making its methods pay off.

Locking in the customer base

A couple of years ago, while the timesharing industry was undergoing its great shakeout, the more savvy suppliers began floundering around in attempts to gain major chunks of business service dollars. GE, for its part, quickly discovered that the approach used traditionally in engineering/scientific problem-solving areas would never work with run-of-the-mill business problems. General ledger and inventory control problems were too individualized for generalized application packages; the cost of building necessary data bases required too much investment if a customer was likely to disappear to another vendor tomorrow.

Nonetheless, there had to be a way to obtain new, large customers and lock them in for a long period of time. GE's method of doing this with minimum sales cost seems obvious in retrospect:

+ Identify companies -- preferably large, Fortune 500 types -- that are studying the feasibility of establishing an in-house network.

+ Convince them that costs and headaches will be lessened if they simply design the operation and let "experts" handle the software development and data processing.

+ Sign up the customer, and start with the heart of his business. Sell him one application at a time -- order entry first, inventory control second, and so on -- in the same progression he probably would have used to implement his own network.

+ In parallel, work with the customer's financial/accounting departments to begin reducing the bookkeeping headaches.

+ As users -- and the supplier's communications network -- become more sophisticated, start integration into one interrelated system.

Result? A customer virtually locked into place. The data bases he has built up and the expertise supplied by his vendor would be difficult to duplicate. And already solved are the problems of dealing with numerous telephone companies, terminal and interconnection suppliers, mainframe manufacturers, etc., simply making the whole system operate -- problems not part of the customer's business.

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The entire process, of course, isn't a bed of roses. There is plenty of the built-in resistance to an outside supplier: Does he really understand my business problems? Will data be secure? I want a big, showcase DP center. An in-house network has already been partially developed. Some of the same skepticism that prevented facilities management from taking off a few years ago.

If attempts to overcome these problems can be measured, however, GE's ISD probably gets very high marks. In just two years, this portion of its total revenues has grown to 15% to 20%; the other 80% to 85% that represents problem-solving applications had a five-year headstart and is still growing, also. But, in the future, GE feels the bulk of its growth will be in new business areas, especially now that it can take over much of a customer's conventional batch processing remotely with the new Mark III service.

Growth without capital investment

Far more important than the ability to minimize sales cost per dollar of revenue, outlined above, is the way GE has extended its service to increase the revenue per dollar of investment. GEISD's current plant represents about $100 million in investment. And its revenue growth, on the order of 30% in 1972, can continue without significant new capital outlays. GE is doing this by filling the gaps in the peaks and valleys so common to usage of any utility:

- Mark III service, announced last October, includes remote-batch processing capability and is priced to encourage users to execute jobs in background mode . . . at times when the system otherwise would be sitting idle.

- Geographic expansion announced recently -- extending Mark III service to Europe (which previously had only Mark II) and to Japan (where only Mark I service had been distributed locally) via the Intelstat IV satellite -- provides GE's Cleveland computer center with much more peak-hour usage. In all, the geographic coverage will cover 17 time zones when the Japan link is completed late in March.

It's too early to measure the success of Mark III, but the geographic expansion already helps. Since the introduction early in 1970 of Cleveland-based service (wholesaled to Honeywell) to Europe, business in Europe has grown to some 1,000 customers and represents 5% to 6% of total GEISD revenues.

Gimmics -- no; questions -- yes

All this geographic expansion might sound like a spectacular publicity gimmic, but GE officials claim that it makes good sense for a number of reasons in addition to the time differential already mentioned: 1) Customers tend to be in consumer electronics, automobiles, oil, and banking -- organizations with significant foreign trade activities; 2) the incremental communications cost is virtually nil compared with plant investment in Cleveland; 3) users don't care if the computer is in Timbuctoo so long as it's there when they want it. And, GE claims, central concentration of large amounts of computer power answers all.

But it also raises certain questions. How do foreign trade regulations apply? The product -- data -- is in many countries simultaneously, and no one can ever pinpoint its actual location. This development in technology requires a whole new concept for dealing with foreign trade problems.

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NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

ALANTHUS CORP.	Alanthus Corp., 77 Tarrytown Rd., White Plains, N.Y. 10607, a computer leasing company emphasizing IBM 370 equipment and independent peripheral gear, filed 400,000 common shares with price by ammendment, Underwriter is C. E. Unterberg, Towbin Co., N.Y.
CAPITAL COMPUTER INC.	Capital Computer, Inc., 1800 Silas Deane Hwy., Rochy Hill, Conn., a computer services company, registered 100,000 units consisting of one common share and one warrant per unit, at a price of $2.50 per unit. Proceeds will be used for debt repayment and other corporate purposes. Underwriters are E. T. Andrews & Co., Inc., Hartford, Conn., and H. E. Simpson Securities Inc., N.Y.
CAMBRIDGE RESEARCH & DEVELOPMENT GROUP, INC.	Cambridge Research & Development Group Inc., 21 Bridge Sq., Westport, Conn., a firm specializing in the acquisition, development and exploitation of inventions. Filed 220,000 common shares, with the proceeds to go to working capital and other corporate purposes. The underwriter is J. D. Winer & Co., N.Y.
MICRO MASK INC.	Micro Mask, Inc., Sunnyvale, Calif., a producer of photographic negatives used in the production of integrated circuits, filed 350,000 common shares with price to be set by ammendment. F. S. Smithers & Co., Inc., New York City is the underwriter.
MULTI-LEASING CORP.	Multi-Leasing Corp., 115 South 10th St., Reading, Pa., an Equipment leasing firm, filed 200,000 common shares at $2.50 per share. The underwriter is Koss Securities Corp., Brooklyn, N.Y.
STANDARD LOGIC INC.	Standard Logic, Inc., 2215 S. Standard Ave., Santa Ana, Calif., a producer of computer components and electronic assembly manufacturing equipment, filed 150,000 shares with warrants covering 75,000 additional shares to be offered in units of 2 shares and one warrant. Price by ammendment, at a maximum of $20 per share, will be through underwriters Muller & Co., N.Y.
TYCO LABORATORIES INC.	Tyco Laboratories, Inc., 16 Hickory Dr., Waltham, Mass., a participant in various scientific research and development programs, filed 359,654 common shares to be offered from time to time with price by ammendment. The proceeds will go to selling stockholders, and the underwriter is yet to be named.
VOICEPRINT LABORATORIES CORP.	Voiceprint Laboratories Corp., 68 Finderne Ave., Somerville, N.J., engaged in the design and manufacturing of equipment capable of identifying and analyzing voices and other sounds, filed 200,000 common shares at $3 per share, with 150,000 to be offered by the company and the remainder by selling stockholders. The underwriters are L. Fane & Co., Inc., Plainfield, N.J. and Katzenberg, Sour & Co., New York City.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" FEBRUARY 2,1973 • VOL.8,NO.7 P.J.McGOVERN,EDITOR

Early relief proposed -- page 6

IBM SETS THE STAGE FOR LARGE, CENTRALIZED DATA BASE SYSTEMS; UNIVAC AND HIS EXPAND THEIR TOP-OF-THE-LINE COMPUTER OFFERINGS

Probably at no time in the whole 20-year history of this industry have we ever stood at the brink of greater technological change in the makeup of systems.

That's the promise made by T.V. Learson at the 1972 Spring Joint Computer Conference, and it began to make sense when, late last summer (EDP/IR Aug.15,1972), IBM unleashed virtual storage and signaled a "turning point in computer economics."

Now, in a computerweek that started off amidst squawking about the magnetic tape erasure in the CDC/IBM settlement (see page 8), IBM has continued to back up the promise (above) made by its just-retired leader. In so doing, it has shifted some of the attention back to mainframes.

In a 15-page press announcement, quite long for IBM or any company to drop into the mail, IBM started February by filling in the top end of its mainframe offering. In a nutshell, the announcement focused on centralization of computer power, resource sharing, large data base capability, communications, multiprocessing. Elements include:

- New memory technologies that allow doubled maximum memory for the 145, 158, and 168 with no increase in physical size;
- Two methods of coupling multiple computers for operation as a single system sharing various resources, including multiprocessor (MP) versions of the 158 and 168;
- A smaller communications controller for terminal networks, plus the ability to use controllers as remote concentrators;
- Advanced software products for on-line teleprocessing and data base management applications in a virtual storage environment.

On other mainframe fronts, Univac and HIS did their best at midmonth to help refocus attention on products, and "vibrations" from all the announcements cause

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EDP/IR to remember the complicated descriptions of things to come offered at the original 700 family announcement by Burroughs. Quietly, what this newsletter has several times described as the "last" or "nameplate" generation of computers now seems to be looming not so many press conferences away. By then, no more than a few years down the announcement pike, mainframes will have names not numbers and, for many, it will be terminal time all day. But back to the present announcement.

New, denser memories

IBM didn't make much of it in the announcement, but one reason it is doubling maximum main memory size on the 145, 158, and 168 is that it is inserting some new technology into its product mix. For the two large CPUs, IBM has come up with an improved version of its Mosfet memory. Thus, "the new storage models can be installed at the user's location within the same size frames housing the smaller storage sizes. No additional floor space will be required to double the capacity of existing Models 158 and 168. Additional power required to drive the memory extensions is provided with the first 1-million character increment on both models." In other words, Mosfet now can be twice as dense.

And the 145 will have an even more impressive -- but still bipolar -- memory chip. Called "extended bipolar monolithic circuitry" and announced in the package, the new chips hold 1,024 data bits each, versus the 128 bits on earlier bipolar, one-eighth-inch-square silicon chips. And the pricing for the new memory looks better, more in line with that of the Mosfet technology on the 158 and 168 (chart, page 3).

Missing models?

It was fairly obvious from the time of the Mosfet announcement that the bipolar memory on the 135 and 145 were somewhat out of line, and that maximum memory sizes offered were limited compared to what is available in other models. Thus, it seems clear to EDP/IR that the new bipolar technology will be used in other IBM products, and that more announcements can be expected for IBM's smaller models in System/370 . . . as well as a new model or so.

The orderly progression from large 360s, via the interim 155 and 165, to a true 370 family shows up clearly on the chart. Equally clear is the lack of order below the 145. Predecessors for these smaller models constitute the bulk of IBM's revenue base, so deliberate speed of replacement can be understood. But more elements are clearly needed if IBM is to continue to offer a full computer family based on today's technology.

There are arguments for IBM's gradually de-emphazing the medium-scale computer; indeed, the concept of distributed computing centers on satellite computers or remote-batch terminals connected to a centralized source of vast computing power and large data files. The latter is offered quite well by IBM's current announcement. But there is a need -- for transition as well as for growth by small computer users, if nothing else -- for a computer that conceptually could be named the 115. The chart emphasizes this fact.

So we expect a computer that could be called the 115 to be announced during 1973. It would probably rent in the $5,000 to $7,000 range, and its announcement could well include clarification of the 125s role . . . there's something perplexing about that computer's limited memory range, and little has been said about its new and different design concept.

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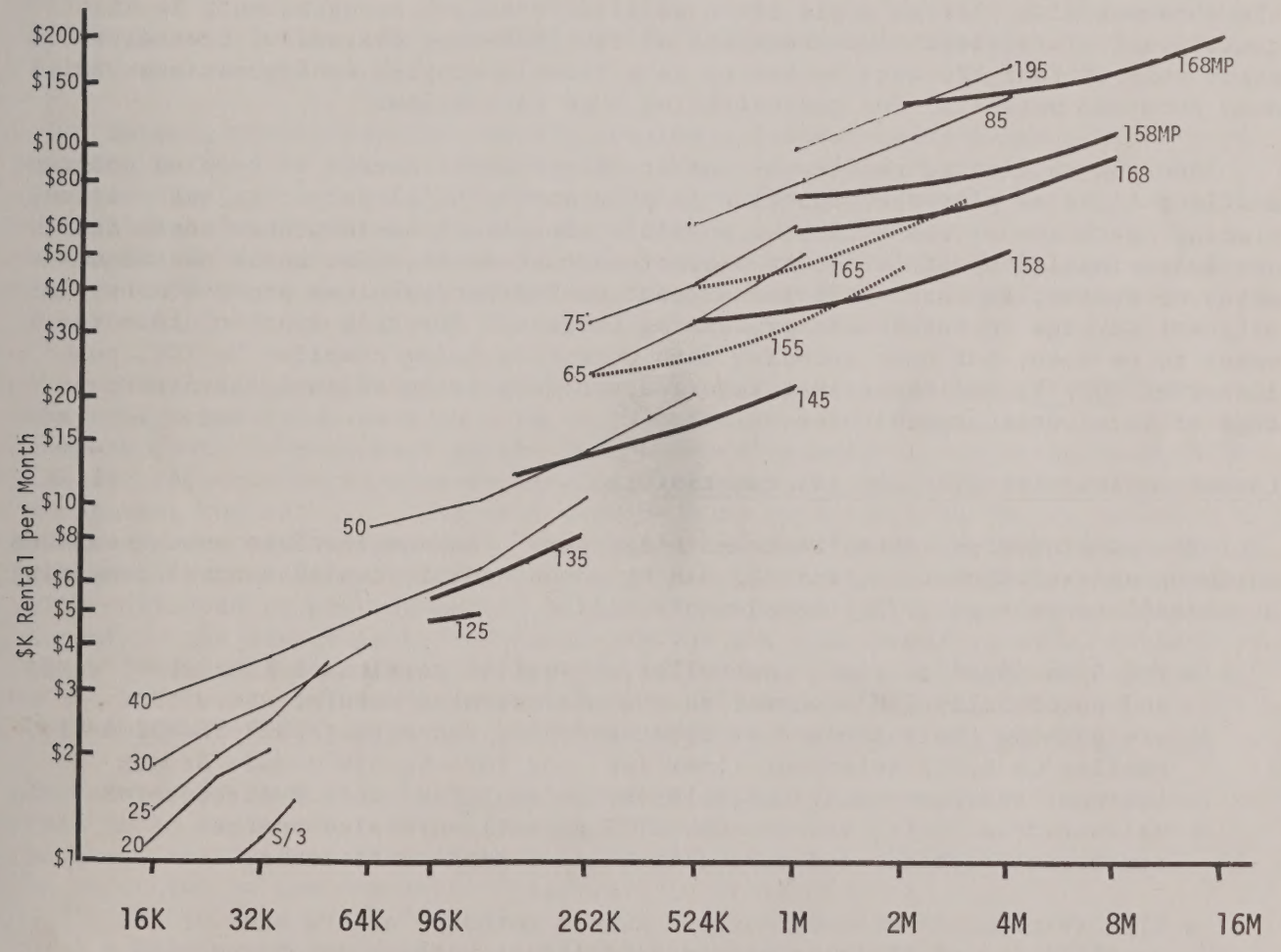
"Loose" and "tight" couples for multiprocessing

With an enhanced version of a previously announced system control program -- called OS/VS2 Release 2 -- IBM has now provided users a way to interconnect multiple large processors and operate them as a single system. And with the addition of a hardware box, this allows MP (multiprocessing) versions of the 158 and 168. Two "coupling" concepts are involved:

- Tightly coupled multiprocessing allows two 158s (with exactly the same size memories) or two 168s of any size to be pushed together, plugged into a special interlink or control unit, and operated as a single computer called a 158 MP or a 168 MP, sharing the total resources so combined. This configuration can be split into two logically independent systems when desired. Thus, the MP could handle remote computing and offer automatic backup during the day, then be switched to two specialized jobs at night.

- Loosely coupled multiprocessing is a software technique through which up to four computers (any of which can be MPs) can share peripherals under the control of one CPU that acts as a traffic cop. The main



RENTAL PRICES for CPU and main memory (with required power supplies and consoles) are shown above for IBM System/360 and 370 computers, plotted against memory size on a log-log scale. The transition from 360 to 370 at the upper end is clear; the picture at the smaller end of IBM's offerings indicates more to come (page 2)

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memories cannot be shared, nor can one CPU automatically take over the workload of another without manual intervention. But, IBM points out, the user achieves greater productivity since one operator can control the job flow in the entire system. Also, he is freed of manually assigning jobs since a new software package -- JES3 -- sends tasks to the processor with the smallest current workload.

"Machines should work . . ."

Here again is evidence of the specifics behind Learson's keynote speech at SJCC last year. Directly after making the statement with which this issue began, IBM's leader at the time said:

> *Let me simply say these developments should make the computer easier to use. Easier to program. They should make it possible for us to store huge data files and have easy access to them.*

Another part of IBM's latest package of announcements are three new features for the 3330 disk storage subsystem. Using a "string switch" and a "32-drive expansion feature," IBM says, "users with advanced applications now will be able to share common disk storage pools of up to 32 drives each among as many as eight computers." This ability to share 256 of the 3330-type drives, of course, would occur only if four MPs were hooked up in a loosely coupled configuration. But it does show the potential for concentrating huge data files.

And the ability to reduce the number of operators needed in coupled computer configurations -- plus the reduction in programming skill inherrent with virtual storage operation -- can well make possible the reduction in people costs that are being implied by IBM's latest product announcements. The moral of the message, of course, is that extra bucks spent on IBM hardware can produce more significant savings in total data processing budgets. The full truth of this remains to be seen, but user spending data currently being compiled by IDC, publisher of EDP/IR, indicates that salaries are decreasing slightly as a percentage of total user expenditures.

Communications for distributed computing

The remainder of IBM's "Welcome to February" package involves communications hardware and software . . . ways of taking advantage of coupled central computing and data base storage. The two elements are:

- The 3704 communications controller, a smaller version of the 3705 and potentially IBM's answer to the minicomputer manufacturers that are pushing their product as front ends and concentrators. The 3704 handles up to 32 telephone lines (vs. 352 for the 3705) and "brings low-cost teleprocessing capabilities to small and medium-sized terminal networks." It, and now the 3705 as well, can also operate as a remote concentrator and take advantage of high-speed lines.

- VTAM (virtual telecommunications access method) "offers many of the capabilities of IBM's teleprocessing access methods now being used, and forms the base for on-line applications growth with System/370." It allows single point control of all communications resources including lines, terminals, and control units. Two other new program products help users implement data base communications applications.

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The VTAM software is scheduled to be available, at no charge, for DOS/VS systems in November of this year; the OS/VS1 version will be ready next February; and the full-blown version for OS/VS2 Release 2 will be available in June of 1974, three months after IBM plans to have Release 2 itself ready for users.

The two major program products -- priced at $700-to-$850 per month for most configurations -- being adapted for virtual storage are IBM's Information Management System and its Customer Information Control System . . . to be dubbed IMS/VS and CICS, respectively. They will be ready for licensing in about one year, IBM says.

In summary

Word filtering out of IBM after the virtual storage announcement last summer was that less than half IBM's plans for VS were announced. That's pretty obvious, now, in light of the package just announced. And there is certainly more to come, but probably nothing startling.

What does all this mean? For one thing, it becomes ever more clear that communications and large data bases are key to the centralized "computer power plants" of the future . . . that virtual storage is to be IBM's primary mode of operation . . . that new technology will continue to be eased into products as it becomes economical.

Second, the concept of loosely coupled multiprocessing as announced -- requiring as it does the ability for each CPU in the "loop" to handle OS/VS2-2 -- promises certain benefits for users of several large systems: Better job stream control and fewer operators, to name a couple. "Old" 370s, 155s and 165s, can be included; and already there is speculation that there probably are ways for larger 360s to be included. Observers recall the "Triplex" system that sounded so promising at one point in Computer Technology's history.

Finally, the reaction from independent peripheral and memory suppliers -- the true competition in this case -- is positive. Continued growth of the IBM computer base is necessary to the independents' survival, and a strong push by IBM for larger memory and more disk drives . . . the push toward the data base management concept . . . can only provide more opportunities for replacement of IBM equipment with plug-to-plug compatible alternatives. So IBM, in continuing to push a "system" concept that becomes harder for other mainframers to supplant, also continues to provide better business prospects for independents. And inherent in the result is better economies for the IBM computer user. Perhaps IBM's Learson is correct in calling VS a "turning point in computer economics."

UNIVAC LOWERS ENTRY LEVEL FOR 1110; HIS ANNOUNCES MULTICS FOR COMMERCIAL USE

Interestingly, two other major mainframers selected the same mid-January day to call press conferences for not-so-major announcements. They both make sense, however, in the evolution of product lines and each -- in different ways -- may be important to the companies involved. In brief:

- Univac announced that its 1110 can now be operated in a one CPU, one memory configuration (called a 1 by 1). Previously, the 1110 was available in multiple processor versions up to the 4 by 4 size. In fact, the importance of the latest version was stressed at the company's demonstration, where a 2 by 2 was "split" on the run into two

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1 by 1s. Conceptually, the Univac product line -- dating back to the 1108 -- can be built up or split apart much like the MP series of 370 recently announced by IBM (page 1). Entry level price for the new 1110 1 by 1 (with a 9300 subsystem as I/O processor) is $36,300/mo.

- HIS introduced what it calls "the most advanced, sophisticated computer system available in the world." Hardware includes one or more 6180 processors (part of the 6000 series) and the software is based on Multics, the Rair or timesharing system developed by Bell Labs, GE, and Project MAC at M.I.T. Cost for a typical system is in the $7 million range, and the first commercial use will be by National CSS, where the Multics machine will allow new applications on the national network the company is about to expand in the philosophy of the Arpa network (EDP/IR Mar.3,1972). More coverage of this computer network concept -- and its impending entrance on the commercial scene -- will be presented in the next issue.

+ + + + +

Early relief requested

COMPUTER INDUSTRY ASSOCIATION PRESENTS INTERIM PLAN FOR IBM MARKETING CURBS

Our members feel that some form of early relief is needed for our industry -- call it a tourniquet to stop the bleeding, if you like -- while the main antitrust action goes on. There may not be a computer industry outside of IBM by the time the trial is over unless this relief is granted.

This is how Dan McGurk, former president of Xerox Data Systems and now president of the Computer Industry Association, sums up the state of things in the computer industry. It's based on meetings, during December, with key industry executives across the country.

Following these meetings, the CIA's board of directors prepared a plan for early relief and submitted it to the Justice Department for consideration. Following the IBM/CDC settlement during January, the CIA made public the eight-point plan it presented. In order of priority, here are the relief measures proposed:

1- IBM must release customers from any cancellation penalties for lease cancellation with thirty days' notice. Any future leases written for more than a year's period will be cancellable at customer's option on not more than 90 days' notice, after the first year, without penalty.

2- IBM must make the following information public: Complete specifications of the interface between all IBM products, both software and hardware. These specifications must be made available at the time of announcement or first delivery of any product (whichever comes first) and should be updated if they are changed through engineering change orders.

3- IBM is enjoined from Tie Selling. Each functional unit of hardware . . . each functional unit of software . . . and each unit of service must be separately priced.

4- IBM must make the following information public: The number of units of each product, by discrete product type, in use by country, as of

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January 1 from 1969 through 1973. In addition, quarterly reports must be filed for each separately priced product, to show shipments to and returns from rental or purchase customers, including country of installation.

5- IBM is enjoined from Predatory Pricing. IBM should be enjoined from pricing at low profit or nonprofit level with the intent or effect of eliminating competition, and enjoined from discriminatory pricing. Pricing of all products should reflect reasonable cost relationships, and prices among customers should not be discriminatory. To ensure this, IBM should submit its pricing rationale on every product offered, to include manufacturing cost, amortization of development, expected volume, and expected production life (to the Department of Justice or to an outside audit firm).

6- IBM must make the following information public: Complete specifications on new or changed media. Since IBM establishes the de facto standards on media, their specifications must be published upon announcement of a new medium.

7- IBM is enjoined from Refusals to Deal: IBM must sell or rent any product or service offered to anybody, to everybody desiring to purchase or rent the product or service. This includes selling spare parts to non-maintenance companies as well as maintenance companies, selling physical standards (such as calibration magnetic tapes and magnetic disk packs) to any company willing to pay a reasonable price, and renting features of computers and devices to owners of IBM equipment. In addition, priority for delivery should be determined strictly by receipt of order. Priority to orders received on day of announcement will be given to manufacturers and service firms.

8- IBM is enjoined from Blocking Competition: Manufacturing date must be reasonably certain before a new or modified product is announced either formally or informally. Results of performance tests, first delivery date, price, expected years in production, as well as requirements of #2 above, must be made public on any announcement of a new or modified product, whether officially announced or revealed to a single customer by an IBM employee. Such performance, price and delivery must be adhered to by IBM for the product; substitutions of alternate products must not be permitted.

The CIA bills itself as "a forum for all segments of the data processing industry." Its present membership, however, is primarily composed of plug-compatible and terminal equipment or non-attached peripheral manufacturers. Having prepared the early relief proposal for Justice (above), it now plans to develop a posture as to minimum consent decree provisions, with emphasis -- as urged by more and more people in and around the computer industry -- on the effect of changing technology in the future of the industry.

There is fairly widespread wonder as to how much good such proposals actually do . . . even from some CIA members. But "nothing ventured, nothing gained" seems to be the prevalent attitude. And EDP/IR must agree. The present proposal is very reasoned when compared to some of the random comments that are heard. At the very least they give balance to IBM's statements about itself (see page 8). And they provide a good point of departure for discussion.

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IBM STATEMENT TO EMPLOYEES January 29, 1973

Telex Corporation and the Department of Justice have been critical of IBM and CDC because the lawyers involved in the IBM-CDC suit disposed of their work product. (Legal work product is the organization and analysis of facts made by lawyers in preparing litigation and consists of evaluations, summaries, notes and indices. CDC lawyers, in this case, stored some of their work in a computerized form, sometimes loosely referred to as a "data base.")

Telex and the Department have alleged that they need the CDC work product to conduct their own cases and that its destruction was improper. The Department has demanded that IBM help it reconstruct the work done by CDC lawyers in planning their legal strategy against IBM.

While this matter is before the courts and we believe that our actions will be upheld judicially, it is important that you understand the following:

- IBM is convinced that the disposition of the CDC lawyers' work product was both legally sound and ethically correct. Nothing else--none of the documents, depositions or other evidence of any kind--was destroyed.

- It is customary and proper, in legal settlements, for lawyers to dispose of such work product. It would be totally inconsistent with the purpose of settlement--and ethically questionable--if the lawyers on each side were to seek to continue the dispute by offering their work and services to others.

- In developing their case, CDC's lawyers selected from the 40 million documents made available by IBM, some 200,000 they judged to be relevant to their case--a reduction of more than 99 percent. About 75,000 of those 200,000 documents were indexed and analyzed by CDC counsel and put in computer accessible form. The Justice Department has copies of all 200,000 documents and about eight lengthy printouts of various portions of the data base. The CDC data base was offered to Telex for the nominal price of $5,000, but the offer was declined.

- Neither IBM nor CDC is obligated in any way to furnish legal aid to the Department of Justice or Telex in a suit against our company. They are both capable of developing their lawsuits against IBM and it is our firm view that neither has any proper claim to the work of CDC's lawyers.

- IBM has distinguished outside counsel and our own chief counsel is a former attorney general of the United States. We believe that our actions in defense of these suits are totally proper.

IBM EXPLAINED ITS VIEWS TO EMPLOYEES (above) after complaints over the CDC/IBM antitrust settlement (EDP/IR Jan.19,1973) picked up. Telex went to the court in Minneapolis with its gripe, and the Justice Department filed its complaint in New York. A hearing is scheduled for Feb. 14 (St. Valentine's Day, coincidentally) and results of both hearings will be reported when they are in.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" FEBRUARY 19,1973 • VOL.8,NO.8 P.J.McGOVERN,EDITOR

And now the "keyflop"

IBM 3740 KEYPUNCH REPLACEMENT, BASED ON 'FLOPPY DISK' FROM SYSTEM/370, EMPHASIZES REMOTE DATA ENTRY AND COMMUNICATIONS

For years, the world has wondered when IBM would finally replace the ubiquitous keypunch and by what.

> . . . Key-to-tape came and almost went while IBM did nothing more than make available a non-compatible Magnetic Tape/Selectric Typewriter adaptation in more of a key-to-cassette approach.
>
> . . . The shared processor was coming into favor from independents when IBM finally did something exciting in data entry -- offer a buffered keypunch to stem competitive losses to a similar product from Univac.
>
> . . . So now, as shared processors are hitting their shipments peak and terminals are beginning to take over some data entry applications in corporate networks, IBM has made what seems to be a major commitment to a new technology.

IBM calls its latest market entry the 3740 data entry system, one "with a dramatically different look in data storage media." At least one competitor, however, is calling it the "keyflop." And this double-entendre certainly goes directly to the heart of the 3740:

- It is based on the diskette, or "floppy disk" first introduced as the input medium for reloadable control store on System/370.
- The product may be more of an interim measure -- a pacifier for loyal customers that want to move away from punched cards -- than the truly "new" generation data entry product IBM would have people believe from the announcement.

Actually, the 3740 looks to EDP Industry Report like one of those proverbial products that "bridge the gap" -- a gap, in this case, between "traditional" concepts of unit record data entry and the coming trend toward centralization and remote input. Such a system implies communications, and the 3740 certainly has features for network applications. But in the case of many initial installations, it looks as if the communications "line" will be the U.S. Mail.

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A family of products

Key to the new system, of course, is the flexible diskette, a platter the size of a small phonograph record sealed in a plastic sleeve and capable of holding as much information as 3,000 standard punched cards. This diskette can be carried to a central device for transmission or conversion to magnetic tape; it can be sent through the mail; or it can operate as a buffer memory for a key entry station that later will transmit information over telephone lines. Components of the system are:

- The 3741 data station, designed for standalone use in individual company departments or remote locations, contains a microprogrammed control unit, typewriter-like keyboard, one or two diskette drives, and a 240-character visual display. It can be equipped with a binary synchronous communications adapter for communicating with another remote station or with a 360, 370, or System/3 computer. There is an emphasis on security with an optional ID card reader that prevents use of remote stations by anyone not authorized. This system element, which rents for less than $200 a month, may turn out to be a popular buffered terminal in disquise. Look at the number it has been assigned!

- The 3742 dual data station has two keyboards, two diskette drives, and a shared visual display. A buffered storage area permits two operators to key data at their own pace, and an option permits data to be copied from one diskette drive to the other and the records merged onto a single diskette.

- The 3747 data converter is a slow, standalone, off-line device that converts diskette data to standard half-inch computer tape for processing. It operates at the rate of 300 128-character records per minute and, with an option, can convert information back from tape to diskette. This unit, in conjunction with several 3742s, is needed in any equipment configuration designed to replace keypunches or shared processors.

- A 3713 matrix printer, with 40-character-per-second capability, can be attached optionally to the 3741 to provide hard copy of data recorded on diskettes and/or transmitted to or from a central computer.

- The 3540 diskette input/output unit attaches directly to a System/370 and can read up to 3,600 diskette records a minute into the computer or write 2,200 records a minute from the computer onto a diskette. It will handle a stack of 20 diskettes and, under program control, automatically feed from the hopper, mount diskettes on the drive spindle, read or record, then remove and stack the diskettes. This fairly expensive member of the family -- it goes for $450 to $800 a month depending on the pricing plan and the number of spindles -- would seem to be a must for any sort of volume operation.

In its announcement of the 3740 family, IBM stresses ease of system use and variety of applications. In single station situations, it points out, operators are assisted in keying correct information by a guidance feature in the system's visual display that tells the type and format of data to be entered.

In high volume installations -- such as an insurance company or a large department store -- IBM expects the dual data stations to replace keypunches and

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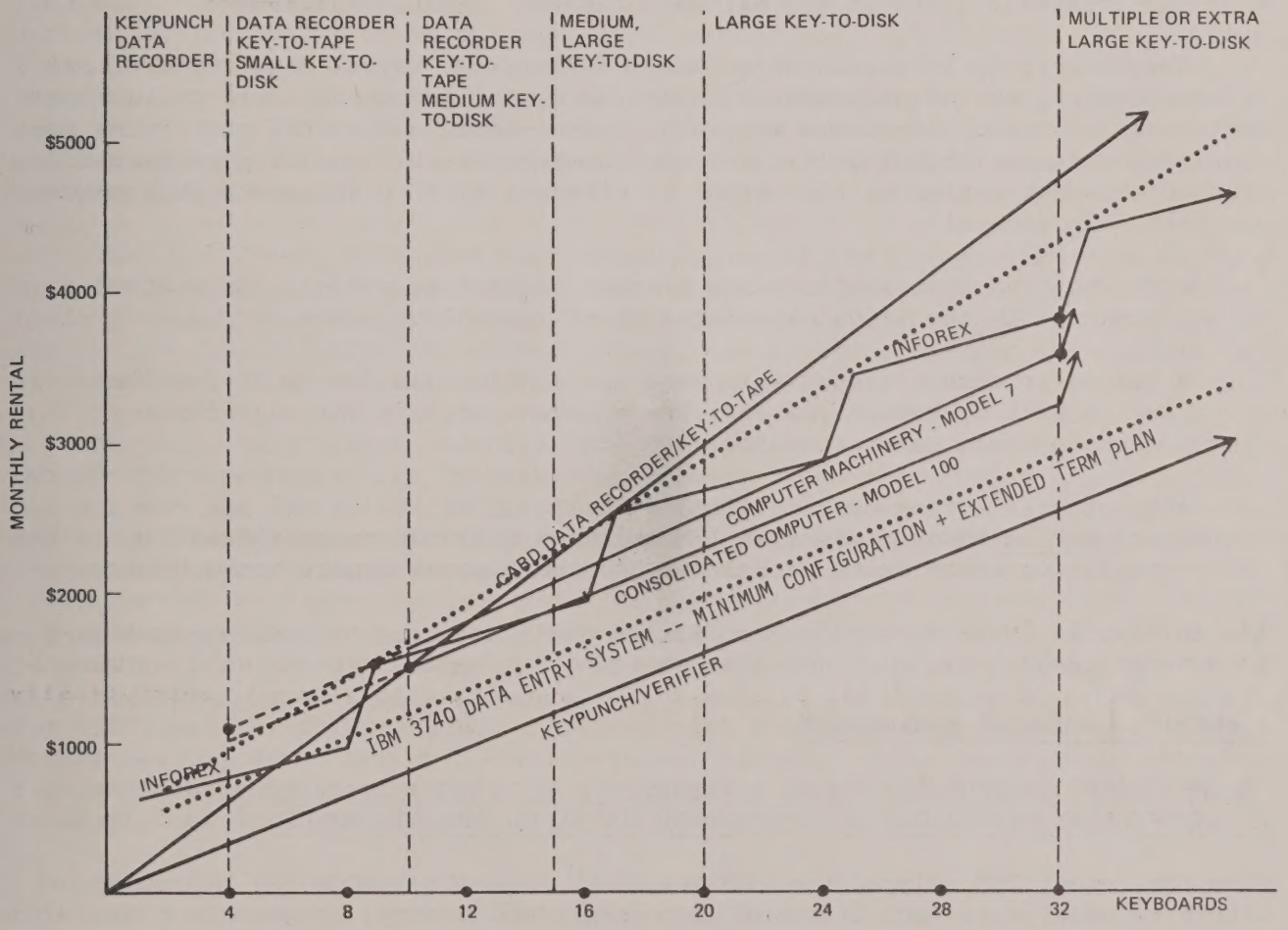
"provide quiet, low-cost operation" while permitting the operators to work independently at their own pace.

How competitive is the 3741?

As the chart below indicates, the 3741 system -- in a minimum configuration of dual data stations with one of the slow diskette-to-tape converters -- is economically attractive when compared with other data entry products. At the six keyboard level, for example, the IBM configuration averages $145 per month and is competitively priced as compared to a buffered keypunch, a key-to-tape, or the Inforex shared processor system.

At larger installations, comparisons are somewhat more difficult, since the user is able to chose from a variety of configurations. IBM provides a medium-sized example that's not unreasonable. A system set up, say, in a home office central location might have two 3741 single stations, eight 3742 dual data sta-

DATA ENTRY PRODUCTS -- COMPETITIVE PRICING



DOTTED LINES (•••) ABOVE SHOW MINIMUM monthly extended term payment for IBM dual station 3742s plus one 3747 data converter as well as a MEDIAN monthly cost when options (see text) are added to the system or rental is desired. Other lines show keypunch/verifier rental price and various key-to-tape and shared processor keyboard prices offered by independents as alternatives.

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tions, and a 3747 data converter. This system would rent for $1,975 under IBM's extended term plan (which requires a 24-month contract). The average price per keyboard in such a system would be $110. If the user has "shorter term needs" and opts for a monthly rental agreement, the cost would go up almost 18% to a monthly charge of $2,323.

The data entry market

Customer deliveries of all 3740 components (except the 3540 I/O unit) begin in the second quarter of this year, and it will be some months after that before customer acceptance and delivery rates can be ascertained. But total data entry demand shouldn't increase too much because of the IBM product, so the following IDC estimate of the U.S. data entry market is still meaningful:

Year	Shipments (#)	Installed Base (#)
1971	43,600	349,010
1972	49,200	379,000
1973	50,800	408,000
1974	52,800	435,000

The numbers include both 80-column and 96-column keypunches, key-to-tape/cassette units, shared processor stations, OCR, and industrial data collection stations. Of those, 80-column keypunch, key-to-tape, and shared processors accounted for almost 36,000 of the shipment numbers in 1972 and this is the portion of shipment estimates that might be effected by 3740 shipments this year and next. In general:

- Key-to-tape installations are already declining, and will be further impacted by the 3740, especially among low-volume users.

- Shared processor system shipments are peaking now, so as 3740 deliveries pick up toward yearend, the shipment dropoff for shared processors could be accelerated.

- Unbuffered keypunches are already declining at 10% to 15% per year, and EDP/IR understands that IBM salesmen will not be penalized for replacing these units with 3740s, so the biggest impact comes here.

All in all, it looks as if IBM has finally decided to convert its punched card base to a newer technology . . . and that pressure for communications will continue.

A child's garden of diskettes?

"FLOPPY DISK" TECHNOLOGY SPAWNS A VARIETY OF NEW USES AND SHAPES AS INDEPENDENT MANUFACTURERS JUMP IN TRYING TO GO IBM ONE BETTER

From the moment IBM slipped the "floppy disk" into its System/370 in connection with a reloadable control store or microprogrammed memory, it was clear that this new technology would start appearing in different guises. It has.

While independent manufacturers were devising several schemes for using a floppy disk or a reasonable facsimile thereof (below) IBM was designing the flexible platter for storage of data entry records, i.e., as a replacement for the omnipresent punched card. That use has come to the market via the 3740 (page 1)

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and is suggested for warehouses, retail stores, insurance companies, and the like for use in remote data collection systems.

Some observers suggest this is only an interim data entry technique for IBM; that remains to be seen. But whether it is or not, it represents another concept now "blessed" by the industry leader. As such, the floppy disk -- or diskette, in official IBM jargon -- is destined to be around for awhile.

A mini disk . . . a cassette competitor

The diskette itself is a mylar platter -- not much larger than the once-popular 45 rpm record -- sealed in a plastic or cardboard envelope. And OEM manufacturers have exploited it in various ways. Touting applications such as maintenance and diagnostic routines for minicomputers, POS data storage, and storage for word processing equipment and programmable calculators, these companies have pushed the floppy disk's advantages over tape cassette storage: (1) random access, for faster editing, and (2) more flexibility and durability.

The costs of diskette systems are usually well above those of casette systems with comparable capacity. But the price is coming down; floppy disks offer certain advantages (above); and many applications would be inconceivable without them. And if the capacity of the disk could be increased -- say, by figuring a way to use both sides of the platter for data -- the diskette would become a real threat to the casette market. As it is, the capacity of the disk just about suffices for handling a 500-person payroll, or the output of a single keyboard operator for a day.

That last fact, of course, is certainly one of the reasons IBM went casette with its punched card replacement. And independents are certain to expand from their present OEM activity with look-alike data entry systems, if the history of the peripherals industry tells us anything. At present, however, the market is for minicomputer peripherals.

Memorex's 651 system, Century Data Systems' 110 system, and Potter Instruments' DD480 represent the "traditional" floppy disk drive approach. They all use a disk that looks like IBM's, have similar packing densities, bit capacities, and speed of reading and writing. The Potter system sells OEM for about $500; the others have a list price near the $750 level.

Iomec goes one step further. It completely encases the mylar disk in a rigid plastic box with a metal strip along one radius to permit reading and writing without actual contact with the disk. Each unit of the company's system sells for $750, but the units can be interfaced with a minicomputer with one of the drives serving as a "master," the others as "slaves." This increase in capacity requires no special instructions by the user; he simply codes his I/O statement as usual, relying on the master drive to find and deliver the data.

Similarly, Intelligent Memory Systems offers a flexible disk drive with expandable capacity. Its basic MU/200 series system stores half a million bits with an average access time of 12.5 milliseconds. The system is expandable to 2 million bits in half-million bit increments that carry an OEM quantity price of $1085 each.

And so it goes. There are even some quasi-floppy disk devices, such as the offering from Innovex. It eliminated the disk, replacing it with a sheet of mag-

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netic tape stretched in a rigid plastic frame (it looks a bit like a ping-pong paddle). And since the "diskette" can't spin, the read/write head rotates under the disk. Thus, it is considerably slower than devices such as that from IMS; on the other hand, if capacity is the principal selection criteria, the Innovex unit gives system designers a lot of storage for their buck -- 1.3 million bits for $500, OEM. Similar capacity from IMS would be six times the cost . . . but would operate almost nine times as fast.

In the OEM marketplace where diskettes are currently popular, the hardware specifications are all important; applications are up to the end user. But as IBM leads the way . . . and popularizes the floppy disk concept . . . more suppliers are sure to begin knocking on customer doors. There, of course, they will have to be ready to rent their equipment, so financial considerations rapidly become the chief concern. That's how the umbrella works.

SURVEY CONFIRMS GROWING OPTIMISM IN DATA ENTRY AND SERVICES SECTORS

To further probe the optimistic aura reported by marketing executives at Fall Joint Computer Conference (EDP/IR Dec.19,1972), a mail questionnaire was sent to the directory of key computer industry marketing executives maintained by International Data Corporation, publisher of EDP/IR.

Results trickled in a little more slowly than expected -- perhaps reflecting the high level of business activity reported by respondees -- but the results paint, if not a detailed portrait, at least a silhouette of industry attitudes as 1973 gets under way. The picture came through best for two of the hottest areas of the industry -- data entry and terminal equipment, and services. A summary of the patterns detected follows.

Data entry and terminals: growth and maybe profits

There are two kinds of optimism in the data entry and terminal business. The first is the optimism of youth, the smaller-than-$5 million company confidently predicting gains of at least 40% to 50% for 1973 and long-term growth in the hundreds and even thousands of percentage points through 1976.

The second optimism, however, exudes from the larger, "established" firms in data, and therefore is more meaningful. These companies -- those with good track records and the financial and marketing credibility that comes with a degree of maturity -- foresee a business increase above the 20% to 25% gains accomplished in 1972.

Furthermore, both groups of respondents -- small and larger producer alike -- are extremely optimistic about prospects in Europe, the battleground on which IBM chose to introduce its new 3740 diskette data entry system (page 1). The smaller companies see their European business doubling for at least the next three years (but doubling from a very small base) and their biggest potential markets in Scandinavia, Switzerland, and the United Kingdom. Interestingly, these countries were, until recently, all non-EEC countries; also, they are the areas where English is more readily accepted as a language for business.

The larger companies have a slightly different view of markets outside the United States. They project growth on the order of 40% or more, but see their chief markets as France, Germany, and the United Kingdom. In addition, many of them expect to make inroads into Japan.

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The reasons for faster growth abroad are obvious. Europe is still relatively virgin territory for new data-entry methods, so spectacular growth will be the rule until the market begins to saturate. In addition, most suppliers view IBM's efforts with its diskette device as a positive force . . . much like unbundling . . . in educating users as to punched-card alternatives. Even so, the competitors that perform best will be those with specialized products that can take advantage of niches in the marketplace. This is especially true in the terminal area, respondents report.

Among the companies in the survey, the 1972 profit picture lacked a coherent pattern. A number of them -- small and large alike -- inched into the black for the first time in 1972; some, however, reported losses due to start-up costs or price erosion, and many indicated no change in profitability over the previous year. On the whole, however, the general profit picture is brighter.

In this bright outlook, though, one issue wasn't breached: the possibility of competition in Europe from Philips, Ericsson, and a number of other companies in a position to fight for a share of the market. This certainly could prove to be a deterrent.

Service bureaus: the view from below

Since only two of EDP/IR's responses came from service bureaus with revenues of $25 million or more, the results represent the view of the "salt of the earth," those smaller companies in the industry that collectively produce 75% -- well over $1 billion -- of industry revenues. The diversity in this sector was discussed in detail earlier (EDP/IR Sept.15,1972).

It has long been a matter of record that service bureaus survive -- indeed, they thrive -- by creating solutions to problems that arise in particular industries. As a consequence, the companies that answered the survey had a lot less in common (from a competitive point of view) than the data entry or terminal folk.

The listing below illustrates this industry fact. Manufacturing received several commendations as a "strong" potential market. But one company specializing in governmental applications gave manufacturing bad marks. Similarly, a number of manufacturing specialists panned local governments as customers.

HOW SERVICE BUREAUS RATE THEIR MARKETS

"Strong"	"Weak"
Manufacturing	Construction
Brokerage	Airlines
Communication	Banks
Wholesale Distribution	Electrical Engineering
Service Industries	Government
Banks	Hotels
Government	Insurance
Health Services	Manufacturing
Municipalities	Petrochemical Industries
Utilities	Retail Distribution

With such a diversity of markets, it seems somewhat surprising, at first glance, that many of the replies indicated the same growth rate projection for

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1973 -- 25% over last year. (This rate, of course, coincides well with EDP/IR's estimates.) And the range of estimates was from 5% to 40%, considerably less than the spread reported in the data entry sector, for instance. Evidently, even the newer entries in the market perceive marketing to be problematic, particularly in developing an effective sales force and gaining product credibility.

On the other hand, profitability in the service bureau sector either held steady or made headway. And since these were nearly all small operations, this finding is consistent with that in the Adapso report on the service industry released last year (EDP/IR Sept.25,1972). The report noted that the most profitable of the service companies were those that did not try to cover too many markets or offer too many extra services. Indeed, that's Rule No. 1 in services.

NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

COMPANY	PRIMARY ACTIVITY	TERMS	UNDERWRITER
COMPUTERVISION CORP. South Ave. Burlington, Ma. 01803	Computer-controlled automation equipment	22,000 shares common, reserved to cover overallotments in connection with participation of Kidder-Peabody & Co. Incorporated in a prospectus offering 370,000 shares common dated December 20, 1972.	
GENERAL AUTOMATION, INC. 1055 South East St. Anaheim, Calif. 92806	Industrial and commercial automation systems	420,000 shares common, 255,000 by the company and 165,000 by certain shareholders, to repay short-term borrowings and provide working capital.	Reynolds Securities, Inc. 120 Broadway New York, N.Y. 10005
HONEYWELL FINANCE, INC. 2701 Fourth Avenue S. Minneapolis, Mn. 55408	Finances customer receivables for Honeywell Information Systems	$50 million debentures, due 1978. Proceeds will be used to reduce short-term indebtedness incurred in connection with the purchase of customer obligations and for other corporate purposes. Honeywell Finance is a wholly owned subsidiary of Honeywell, Inc.	Eastman Dillon, Union Securities & Co., Inc. One Chase Manhattan Plaza New York, N.Y. 10005
ITEL INVESTORS GROUP I One Embarcadero Center San Francisco,Ca. 94111	Computer leasing	$10 million of partnership units, offered for sale at $2500 per unit with a minimum purchase of two units. Offering to be made through DuPont Glore Forgan Incorporated, acting as manager of the soliciting dealers.	
MCI COMMUNICATIONS CORP. 1150 17th St. N.W. Washington, D.C. 20036	Microwave communication services	975,000 shares common, in proposed 4-1/2 to 1 exchange for present common shares of Microwave Communications, Inc.	
PLESSEY COMPANY, LTD. 2-60 Vicarage Lane Ilford, Essex, England	Telecommunications and electronic components equipment	250,000 shares dollar ordinary shares, offered in connection with the conversion, exchange, or exercise of securities with Alloys Unlimited, Inc.	
THE SINGER COMPANY 30 Rockefeller Plaza New York, N.Y. 10020	Diversified manufacturing company	14,014 shares common, offered from time to time by certain shareholders.	Goldman, Sachs & Co. 55 Broad St. New York, N.Y. 10005
TEXAS INSTRUMENTS, INC. 13500 N. Central Expressway Dallas, Tex. 75222	Computing equipment	16,000 shares common, pursuant to the company's Amended Incentive Compensation Plan.	

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"THE GRAY SHEET" MARCH 7,1973 • VOL.8,NO.9 P.J.McGOVERN,EDITOR

Software disguised as hardware -- page 4

IBM REMOVES SYSTEM/370 OVERTIME CHARGES IN NEW FOUR-YEAR TERM LEASE PLAN; COMMUNICATIONS USERS CAN BENEFIT, BUT EQUIPMENT CHANGE PENALTIES AREN'T TRIVIAL

For an announcement that will probably have as much impact on computer industry economics as anything since virtual storage or the extended term lease plan, IBM late last Friday afternoon chose simply to "sneak" copy out to the wire services. So seemingly much as planned, the deftly terse announcement got routinely picked up by Saturday or Monday morning newspapers, buried and paraphrased. It read:

> WHITE PLAINS, N.Y., March 2 . . . International Business Machines Corporation today announced a term lease plan. This new plan is in addition to standard lease and purchase plans now being offered.
>
> The plan covers the virtual storage central processors of System/370 Models 125, 135, 145, 158, and 168 and their associated multisystem units, channels, consoles, power and coolant units. The monthly charge under the term lease plan is the same as the standard monthly lease charge for these machines, but the machines can be used for an unlimited amount of time at no additional monthly charge. The term lease plan provides for a 48-month contract period.
>
> IBM said the new plan will benefit customers with high utilization of data processing equipment. Users of teleprocessing and data base data communications systems will now be able to run their applications round-the-clock at no added rental cost.
>
> The term lease plan is being announced for the United States and Canada.

As every alert reader knows, the implications in the above are vast . . . for IBM, for leasing companies and used equipment dealers, for other mainframe manufacturers, for planners in computer using organizations. Before discussing these in a preliminary fashion, however, EDP Industry Report thinks it important to run down at least the more important of the things IBM didn't say:

- Penalty for termination is stiff, figuring out to about 12.5% of purchase price during the first two years, then declining;
- "Termination" includes a CPU upgrade such as going from a 158 to a

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168 during the lease period, as well as downgrades or feature removal;

- Addition of features, such as channels or more memory, require lease extension based on a complicated formula (with shortest extensions for small incremental additions or leases that are near expiration) or the payment of a premium of 15% above rental for the feature;

- Purchase credit may be accumulated over the entire four years of the lease, up to a maximum of 50% of the system price;

- Partial protection against price increases is provided, since charges for additional memory on the same CPU are based only on the price increment existing at the time of upgrade.

Other "goodies" may lurk in the fine print, but IBM has assured EDP/IR that plan essentials have been covered during several days of telephone questioning. They are reported in this issue. Users, of course, will discover the exact nature of the plan as they talk to their salesmen. Therefore, EDP/IR will shortly survey U.S. computer installations as to their reception of the new plan. Results of the survey will be reported once they are analyzed.

The importance of telecommunications . . .

Despite all the restrictions on equipment changes, IBM's new term lease will definitely benefit a growing portion of the computer user base -- the organizations with a teleprocessing or data base communications network. International Data Corporation, publisher of EDP/IR, has recently completed an extensive report series on teleprocessing use; the overwhelming conclusions are that:

+ Teleprocessing will be the modus operandi of more and more computer users during the next five years;

+ Most users plan an orderly, phased move from their batch operation into a teleprocessing environment.

Because of these long-range plans for teleprocessing, IDC was able to quantify what the teleprocessing scene in the U.S. will look like five years hence. And because these are the users most likely to consider IBM's four-year lease during equipment acquisition -- or convert to it immediately -- the use of terminals on medium and large systems -- now and in the future -- is an important consideration. For medium scale and larger computers from all manufacturers, IDC's surveys indicate high and growing terminal use:

Monthly Rental Range	Typical IBM System	Percent of CPUs with Terminals 1972	1977
$10,000 - $20,000	370/135	40%	65%
$20,000 - $40,000	370/145	73	94
$40,000 - $80,000	370/15X	82	96
More than $80,000	370/16X	86	97

This data dramatically brings home the fact that the majority of large users already are experimenting with -- or using -- telecommunications. And within a few years, it will be extremely unusual to find a large computer not in a network. IBM 370s, designed for communications, will equal or surpass the averages above.

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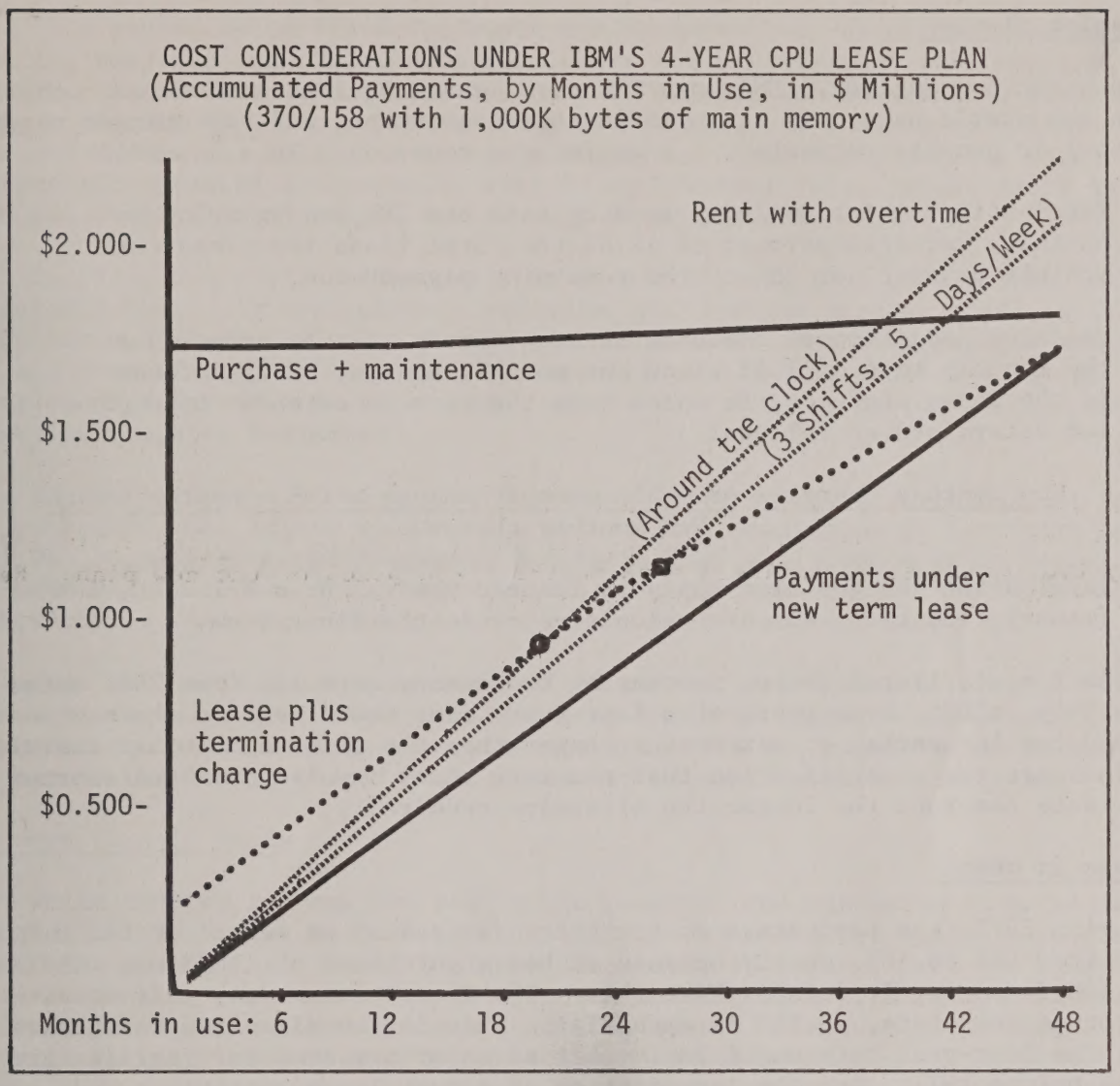

. . . and that means overtime

Few if any computers that support terminals operate on a 9-to-5 schedule. Most networks operate for at least 12 hours during each working day, and quite often the associated computers are used additional hours -- even full shifts -- for large batch operations. Thus, overtime charges are important.

Prior to the latest announcement, IBM's rental contract was based on left-over concepts from batch processing days: 176 hours -- 22 days, 8 hours a day -- makes a month. Additional equipment use was billed under a formula that adds 10% to the rental bill for each additional 176 hours per month. Thus, around-the-clock usage could add slightly over 30% to the user's bill (chart, above).

So savings under IBM's new term lease correlate directly with the amount of overtime used now or planned for the future. The new plan does involve a four-year commitment to equipment, and has penalties (page 4) for any changes -- including upgrades. But the "breakeven" point under the lease -- lease payments plus penalties subtracted from what payments with overtime would have been -- can be as near as 20 months of operation [O on chart] with constant use, or 26 months [□] for full-time operation five days a week.

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No escaping clauses

As described earlier, IBM's new CPU term lease requires a four-year commitment on the user's part. It is an inflexible commitment, and any changes require additional or penalty payments . . . or lease extensions. In a nutshell:

- Termination (which includes sending back one CPU and bringing in another) requires payment of 12.5% the total lease (48 times the monthly payment) or 25% of the remaining payment due.

- Upgrades (addition of features or more memory) can be added 1) at the monthly rate of 1.15 times the monthly charge, or 2) included in the lease contract, in which case the term is extended by a period determined as follows:

$$\frac{\text{New monthly charge} \times 48 - \text{Old monthly charge} \times (48 - \text{months used})}{\text{New monthly charge}}$$

- Termination charges also apply to feature removal or model downgrade (memory reduction) and are calculated as in the first item.

Under the formula listed above, increasing the memory on a 145 from 256K bytes to 512k bytes after three years of a four-year lease would require the new lease to extend for 18 months, or six months longer than the original. Other examples would indicate the generalization that the more money involved, or the shorter time a lease has run, the longer the extension required.

What does it mean?

During 1972, the percentage of computers (by value) on rental in the U.S. dropped from 55% to 50%, mostly because of heavy purchases of IBM/370s. Obviously, IBM is saying it doesn't like this. The lease plans apply only to virtual storage computers, so IBM is emphasizing this is the direction things are going. The four-year term would imply that no major new computer families are expected before 1977. And the introduction of a term lease approves a user acquisition philosophy already used by many other mainframers (but denied IBM for 10 years in the 1956 Consent Decree) and third-party leasing companies. For the latter, an expected value has been put on used 370s four years hence.

So EDP/IR must conclude this is but one more factor in the "new computer economics" promised with Virtual Storage. We will watch, measure, and report the marketplace acceptance of IBM's new term lease plan.

+ + + + + + +

A service . . . that looks like hardware

TURNKEY SYSTEMS FOR SMALL BUSINESS PROVIDE ALTERNATIVE TO SERVICE BUREAUS; MINICOMPUTER MANUFACTURERS RECOGNIZE THE GROWING MARKET, EYE POSSIBLE ENTRY

One of the remaining virgin markets for computer manufacturers -- long talked about but until recently nothing but a pipedream -- is the hundreds of thousands of small businesses across the country. A few small companies are assembling small system packages, hooking them to minicomputers, and going after the small businessman. Just last week Burroughs announced its entry, the B 700, that is designed exactly for this marketplace. [Ed. Note: The B 700 will be covered in detail in the next issue of EDP/IR.]

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This market -- providing software and hardware for the gap between large accounting machines and the IBM System/3 -- is for systems that sell for $20,000 to $75,000. The solution, to date, has been a "package" built around a minicomputer such as the DEC PDP-8 or the Data General Nova 1200 . . . designed so that the user can ignore the fact that he has a computer. This is essential, since these systems are marketed to companies with 50 to 200 employees, annual sales in the $500,000 to $2 million range, and no budget for programmers.

In fact, the small business system market doesn't look at all like the minicomputer market. It more closely resembles the service bureau sector, which for years has solved problems for the small businessman. But minicomputer manufacturers are being forced to examine the possibility of biting the bullet (page 7) and entering this market. In brief, mini makers must finally decide if they want to enter the computer business!

Small business systems do not represent a new market . . . simply an emerging potential that it now showing its size. Mini manufacturers for years have been OEM suppliers to this market. But technology will soon make it feasible for end-user suppliers to build their own minis, at a competitive cost, from semiconductor chips. And mini makers want a market left when this happens.

This will mean a complete reversal of current mini-maker strategy, which today more resembles electronic manufacturing than the computer industry. But when programming and maintenance enter the picture, it's no longer "build as many as you can at the lowest cost;" a whole new set of considerations emerges.

Two ways to hold hands

While turnkey systems are really too powerful and expensive to be called accounting machines, the businesses that will use them are too small to be thinking about data processing. Small business computers, therefore, need the simplicity of an accounting machine -- but the problem-solving ability no accounting machine can handle. And in marketing this kind of a system, the supplier competes directly with the service bureau. But there is room for both.

As pointed out last fall, the service bureau marketplace can be analyzed from two points of view (EDP/IR Sept. 15,1972). Users access the computer by one of three methods -- batch, remote batch, or rair (remote access/immediate response). Computers respond in one of three methods -- raw power or computation, transaction processing, or data base inquiry. Each combination of user access and computer response forms a separate sector of the market.

Applications for small business systems resemble those in the four sectors defined by the intersection of remote-batch and rair processing with transaction and data base inquiry. But this is where the growth potential lies in the service bureau market (i.e., not too much is being done at present; only in data base entry such as airline reservation systems will turnkey systems be competing with an established service bureau domain).

So turnkey system suppliers, just like service operators, will have to seek out these new markets by focusing on a particular industry, understanding its problems, and building a system with the hardware and software to handle them. Inevitably, as these two "problems-oriented" industries expand their marketing, a collision will occur. The potential customer will be faced with two ways to have his hand held as he ventures into the world of computer power:

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Service bureaus have a certain allure in wooing clients away from the accounting machine. Most businessmen are unfamiliar with data processing equipment, so the bureau offers the line of least resistance, a way to increase data-handling capacity at minimal cost to his life style. Maintenance is no problem. And he doesn't have to worry about hiring a programmer. The dollar cost of a bureau is higher than a corresponding turnkey system, but human cost is lower.

Turnkey systems, on the other hand, offer the businessman considerably more control over his accounting applications. This aspect of marketing, as well as the slightly lower cost, can be a real plus if system support is in order:

- Maintenance must be readily available. This limitation, in fact, has kept some turnkey system suppliers confined to a regional market. (For example, Ultimacc Systems, until recently, and Computer Interactions have confined themselves to the New York metropolitan area; Cascade Data restricts itself to the Michigan-Indiana market.)

- Programming must be transparent to the manager, and operators must need a minimum of system training. In addition, if the turnkey system allows a manager to develop his own routines, so that he can tailor applications as they arise, the small business system can promise considerably more control than the service bureau.

As the small business computer market develops, the manufacturers of these systems will begin to see that their real competitors are not each other but the service bureaus that serve the same industry. However, the present marketing strategy tends to be less industry oriented, with standardized software applications (general inventory, accounts receivable, accounts payable, payroll). But this will change as turnkey suppliers learn to specialize for profitability.

Down from System/3

The small business computer market is experiencing an evolution in marketing styles -- from a System/3-at-half-the-price approach to application packages tailored to small businessmen in particular industries. It's an evolution that perhaps Darwin would have appreciated, for it is the latter approach that will survive as the fittest attack on a market untutored in computer ways.

But the first approach was to huddle under the IBM umbrella. A California company, Four Phase Systems, is a good example. Its IV/70 specifications are completely comparable with some of the larger turnkey systems, but it's not sold to small businesses. Instead, sales efforts are aimed at divisions and regional offices of large corporations that have the same problems as small businesses -- large amounts of paperwork without a budget to support a System/3. And in these applications, the system doubles as an intelligent terminal.

Now, the prevalent attack concentrates on the standard accounting application, with software tailored slightly to meet individual customer needs. Ultimacc Systems of Edgewater, N.J. is such a company, just breaking out of the New York market with small-to-medium sized businesses. The system it offers is both smaller and cheaper than System/3, and Ultimacc specializes in hand holding. So from 1970 to the present, the company has tripled its customer base from 9 to 28.

Other companies -- including Cascade Data, Computer Interactions, Custom Computer, Eldorado Electrodata, and Quantel Systems -- have taken this path to

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WHAT'S A MINI-MANUFACTURER TO DO?

During the last year, several minicomputer manufacturers took their first, tentative steps into the end-user market. With the exception of Data General, which decided to add disk drives and other peripherals and sell user-oriented minicomputer systems, several major suppliers are testing the turnkey environment. For example:

+ Digital Equipment has quietly been offering PDP-8s to software suppliers at two per cent of purchase price/month rental in return for a line of user-oriented software. With its secure cash position, DEC appears to be in the best position to offer a turnkey system without capital traumas.

+ General Automation, more than other mini-builders, has invested in support software for customers. However, it hasn't been able to keep its bread-and-butter OEM sales high enough to permit further investment in full-fledged end-user marketing.

+ Interdata, meanwhile, moved into selling communications systems to end users. And at this writing it was about to announce a microprogrammable product that could be adapted to many other turnkey uses.

+ Varian has had its small business system for hotels (see text) for some time. In the past year, it tried to implement other software packages, including a system at the Olympics.

Despite these moves, and the eventual payoffs that turnkey systems seem to promise, most minicomputer manufacturers are uneasy about this market. Their first concern is picking the right end-user market, in terms of possible competition and minimum initial investment. This blind spot has kept minimakers from venturing into this market more aggressively until now.

Lesser, but still significant, concerns include the loss of control of the customer's use of their systems. In the end-user markets, the mini builders will have to face unfamiliar demands for special applications and customer education they never experienced with OEM manufacturers. This is but the major difficulty in developing a new marketing organization, a major management hurdle.

Finally, the mini manufacturer faces problems that other end-user marketers need not consider -- the impact of his new marketing strategy on present OEM customers. End-user sales could cut directly into OEM purchases, or the present turnkey suppliers could go into production themselves. Either way, the mini maker cuts himself out of his market.

the small business computer market. These companies don't like their product compared with System/3, but except for the pricetag and the extent of hand-holding, these turnkey systems don't look much different. But if they are to be successful, it is hard to see how they won't be faced with a dilemma regarding software support . . . either hire more programmers to tailor systems, or standardize packages. Either way out could make systems more expensive and less attractive to customers looking at the service bureau alternative.

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Asyst, Inc., a software company in Cincinnati, teamed its software packages with a Cincinnati Milacron minicomputer to produce a different kind of small business system. It began by selling branch office terminals to life insurance companies, then adapted the general software to insurance applications. The speed of the system was needed because life insurance allown no accounts payable -- once a claim is affirmed it is paid immediately. Subsequently, the company has diversified into other small business applications, such as the clothing industry and jewelry, always concentrating on the application, not the hardware.

Variations on the same theme are popping up all over. Two companies, for example, have taken an interest in hotel systems. One is Varian, which has its Talix system originally designed to detect empty hotel rooms. Meanwhile, Moby-data, a company from upstate New York, markets its Commander system to hotels and country clubs as an accounting machine plus reservation system (it even handles tee-off times). Another variation on leisure-time applications is the Centronics turnkey casino system operating at Caesar's Palace in Las Vegas.

Small turnkey systems are handling accounting plus diagnosis in hospitals . . . truck scheduling and dispatching at gravel companies . . . recipe control at bakeries . . . and so on. A Dallas company, Tocom, Inc., is even building a rather large turnkey system for use with cable television networks, a relatively new market compared to hotels or bakeries (EDP/IR Nov.27,1972).

A few software companies seem to be taking the general-purpose approach, at least to enter this market. Engineering Computer Systems of Lexington, Mass. during the last 18 months has developed and installed over 150 applications software systems for over 100 small system users. About two-thirds have been for System/3 users, but the balance are on a variety of smaller machines such as the Basic Four, the DEC System 300 and 500, and Honeywell 58 computers. Keane Associates, for the last year, has marketed a small business computer called System/4 (a modification of the Cogar System/4). Its approach in placing more than 50 systems at state agencies, hospitals, manufacturing centers, and service bureaus is to sell a stand-alone small computer that can be integrated into a processing network when needed.

Moral -- know the enemy

Discovering an industry with a problem that a little computer power could solve, solving it with a software package, marrying the software to a minicomputer (or even a word processing system), and selling the system as a small business computer system . . . this is not a difficult task in any number of industries. Industries with a technology to control, such as printing; industries with inventories and long billing cycles, like furniture stores and wholesalers; industries with extensive legal paperwork requirements, such as with Medicare and narcotics control in drug stores; all can use the turnkey computer. It's primarily a matter of creating the system that convinces a potential customer that he needs a computer to do it.

The small business computer is a computer in name only. It's actually a service that happens to look like a piece of hardware. So companies in the small business markets will succeed by looking to the service bureaus -- not each other -- as competition. Smaller versions of the System/3 have enjoyed first fruits of the market, but will find support problems multiplying. The real success in this market, as Darwin would have forecast, will be companies that take the same routes as service companies, exploring niches in the accounting oriented industries more carefully.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" MARCH 19,1973 • VOL.8,NO.10 P.J.McGOVERN,EDITOR

Burroughs' simple but sophisticated small computer -- page 5

IBM FILLS OUT ITS LINE: 370/115 LOOKS LIKE 370/125; WINCHESTER DISK FILE STILL SHROUDED IN SECRECY AS NEW ERA IN MASS MEMORY BEGINS

For the first time in years, if ever, all the rumored IBM products have been announced. A couple of weeks ago there was the 3420 tape system with its 6250 bpi high-density recording method (see page 4); last week came the 115 and the long-discussed "Winchester" disk drive, announced as the 3340. It has some number of heads reading and writing on some number of surfaces on a removable "data module" about the size of a portable typewriter.

These new products combined with IBM's recently announced 4-year term lease plan for CPUs (see page 5 for an important note on this plan) make the competitive atmosphere seem to be clearer than it has been for ages. There will be more announcements, for sure, but nothing in the active rumor mill of late is still in doubt. In a sense, IBM has showed its cards and placed its bet.

So it seems to EDP Industry Report that the computer industry companies directly dependent on IBM for market planning and marketplace conditions -- the independent plug-compatible peripheral manufacturers and the third-party leasing companies -- finally have a chance to firm up their plans and realistically look ahead for more than a few months.

Likewise, the other mainframe companies -- most of which have been ambling along for some time on face-lifted, vintage products -- now can make their new product announcements with somewhat more certainty. IBM's product line and its pricing philosophy are both established for a few years, sitting targets rather than cloudy concepts for which potential customers are waiting.

The 370/115, announced last week, has many of the same characteristics, and leaves some of the same unanswered questions, as the 370/125 (EDP/IR Oct.26,1972). Here are some highlights:

- Only two memory sizes -- 64K and 98K bytes -- with implied memory cost of 29 cents per byte, slightly lower than the 125. So once again IBM seems to have placed an arbitrary upper bound on memory.

- A "new concept in information storage," the 3340 drive and its

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associated 3348 IBM Data Module. It can also be used on larger models of 370 (see below).

- A new printer, the 3203, "which surpasses several speed, efficiency, and reliability standards" of the popular 1403. It features a built-in vacuum cleaning system, needs no controller, and operates at 600 and 1,200 lines per minute.

- Rental in the $5,600 to $7,550 range (using extended term prices for all peripherals when applicable) and the option of the new four-year term lease on the CPU (EDP/IR Mar.7,1973).

- "Distributed function asymmetric multiprocessor" organization -- introduced on the 370/125 -- with instruction, service, and input/output processors connected via a bus to main memory.

- Ability to read and punch either 80- or 96-column cards, "the latter giving it the ability to exchange data with an IBM System/3."

- An integrated Model 20 emulator at no additional charge, plus a "highly compatible Assembler language capability" and four high-level languages -- RPG II, Cobol, Fortran, and PL/1. The 115's DOS/VS control program "requires little or no reprogramming of applications running under System/360's Disk Operating System."

So the 115 is about what was expected: A member of System/370, designed as a Virtual Storage upgrade for System/3, the 360/20, 22, and 25. Architecturally, it looks like the 125, as well it should, since it a'so was developed at IBM's laboratories in Boeblingen, Germany.

The data module -- media or machine?

Announcement of the 115 was no surprise -- it had been expected for months. But the partial lifting of the shroud of secrecy around the "magnetic disk device with a new storage concept" -- the 3340 Data Module, long talked about in rumor stage as Winchester -- has captured all the attention. This peripheral:

- Writes more than 1.5 million bits of data per square inch on the disk surface in the 3348 module -- twice the recording density of the 3330 and nearly eight times that of the 2314.

- Combines disk recording surfaces, access arms, and read/write heads into a single removable cartridge. IBM says this "eliminates problems caused by minute head-to-track misalignments."

- Comes in two capacities -- 34.9 and 69.8 million characters of information -- that are completely interchangeable, allowing any module of either size to be used on any disk drive.

- Connects directly to the 115 and the 125 via an I/O processor, or to larger DOS/VS models of System/370 through the integrated adapter or the 3830-II controller. Four spindles can attach to the 115, up to eight to the 125, 16 to 135s and 145s, 32 to 158s or 155-IIs.

But IBM isn't saying how the device works. When routinely asked how many

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platters or disks were inside one of the packs, the IBM spokesman calmly said: "That's proprietary." Pressing further, EDP/IR asked how many heads there are per recording surface. After a pause to check, IBM countered with a "No comment on that one, either." So we said that the major inference to be drawn was that IBM, playing it close to the line, seemed to be trying to make things as difficult as possible for the independent peripheral manufacturers. "[Silence]"

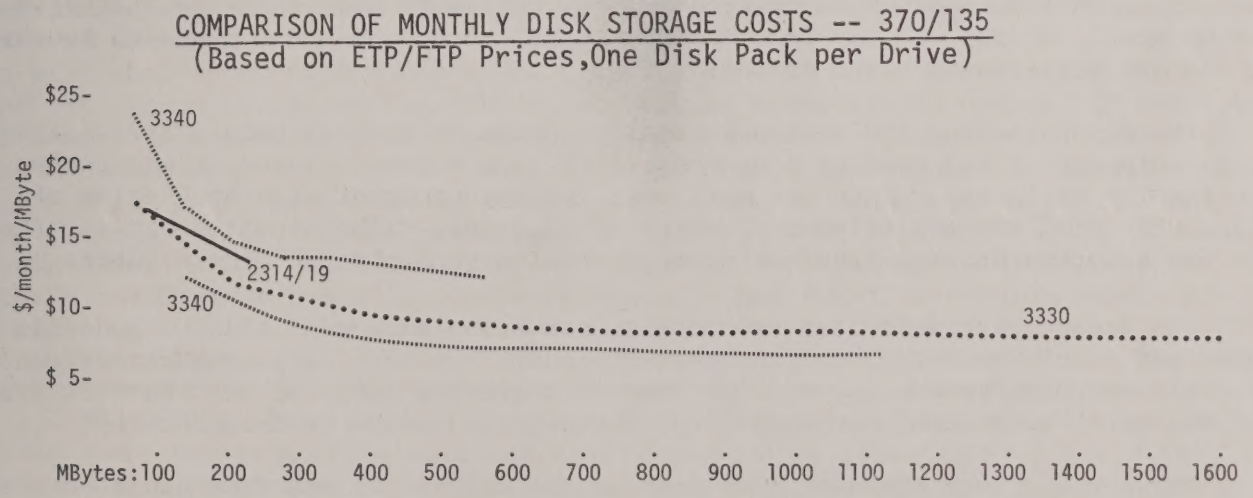
Despite the secrecy, in fact, the independents are in a bind if they decide to go after the vast potential business the 3340 holds as 115s and 125s begin quantity displacement of IBM 360/30s and below. Most of the drive manufacturers have no experience in disk plating technology, which obviously is highly advanced in the 3340; likewise, few disk pack suppliers know much about manufacturing the heads, access arms, and servo mechanisms that are hidden inside the packs.

IBM itself must consider the 3348 module a piece of equipment: It carries an extended term plan price as well as rental and purchase. But it's not too expensive as a piece of hardware: $1600 or $2200 depending on capacity. And the rental to purchase ratio of 27 to 32 months (rent or ETP) puts it more in the terminal or typewriter, short-payout category.

A file to watch

First deliveries of the 3340 are late this year for 125 users, first quarter of 1974 -- along with the 115 -- for other 370s. So unless there's a change in the groundrules, it will be some time before potential second-source suppliers can get their hands on this product, dismantle it, and find out just how difficult their design and engineering task might be. Then, of course, there is the necessary lead time before manufacturing and delivery to customers can begin, but probably not so long as the two years the ETP locks in users. A bind?

And IBM won't be sitting still. From the relative ease with which capacity already can be doubled . . . from implications in technical papers during the



COST FOR THREE GENERATIONS of removable-media IBM disk drives is plotted above for the 370/135, smallest CPU that can use all three. Calculations are based on integrated file adapters and extended term rental where applicable. The two curves for the 3340 are obtained simply by use of different capacity, completely interchangeable modules, with heads inside. This illustrates potential of what appears to be the first of a new generation of mass storage peripherals.

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last few years . . . from past IBM practice . . . it looks to EDP/IR as if the 3340 is only the beginning of a new disk drive generation, comparable to the 2311 in its growth cycle. It simply doubles the recording density from the 3330 level, and an order of magnitude increase has been all but promised before the practical bounds of rotating magnetic media are reached.

One of IBM's consistent corporate policies for many years has been to plow profits into research rather than pay it out in dividends. And with the 1970s -- and 370 -- this policy seems to be paying off. From a company offering "me too" or even second-rate technology as the computer era began, IBM has become the pacesetter in many areas . . . memories of all types, in particular. As pointed out, the cards are on the table. And it looks as if the day has arrived when product planning from Armonk is a hard act to follow.

IBM INTRODUCES HIGH DENSITY TAPE SYSTEM . . . STORAGE TECHNOLOGY FOLLOWS SUIT

A few days before announcing the 115 and Winchester, IBM pushed out the other announcement that had been expected for some time -- new models of the 3420 tape drive that feature "the densest data recording capability yet offered to IBM magnetic tape users." A single reel of tape now can hold triple the amount of information, recorded at 6250 bytes per inch. IBM says this is possible because of three advances in technology:

(1) With group coded recording (GCR), information to be written on tape is segmented into groups of characters to which a special coding character is added; when GCR recorded information is read by the CPU, it is restored to its original form.
(2) An improved encoding and checking system corrects errors in a single track or two tracks simultaneously, rather than only one as before.
(3) A precision motion control system feeds data to the computer at up to 1.25 million bytes/second, compared to a previous max. of 320,000.

The new drives -- labeled Model 4, 6, and 8 -- will be available the fourth quarter of this year and cost between 50% and 100% more than their counterparts, the Models 3, 5, and 7. Any 3420 already installed can be field upgraded to any of the new high-density type drives.

The day following IBM's announcement, Storage Technology Corp., 1972's leader in shipment of independent plug-compatible tape drives, proved it was ready for the IBM challenge. Into the mail went its announcement of a new series of tapes that provide read/write capability of 6250 bpi. (The expected density from IBM was 6400, so Storage Tech's choice of density probably isn't coincidence.)

The independent said that two models were being made available with double speed and double density . . . and that its current line of tape subsystems can be field upgraded to the new models. But it neglected to point out that its system has only "subsystem" compatibility, i.e., tapes cannot be interchanged.

Thus, the drives are not "plug-to-plug compatible" in the true sense of the phrase. But prices are 5% to 15% lower than the comparable IBM models, and the approach illustrates that there are more ways than one to accomplish a technical feat. In disk drives, however, a similar double-density approach has not worked terribly will in the face of IBM's 3330, and "new" technology. And IBM has already introduced still more advanced technology (above). Still, it may be the only tack open to independents . . . the waters are choppy.

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Armed with hardware, software, and a customer base

BURROUGHS FILLS OUT ITS OWN PRODUCT LINE, JUMPS INTO SMALL BUSINESS MARKETPLACE

With its "advanced systems concepts" described by buzzwords only Burroughs will use, the B 700 introduced earlier this month is a computer sophisticate's dream on the inside . . . definitely one of the most advanced little computers on the market today. Yet it looks so simple -- so much like a glorified accounting machine with a couple of file cabinets nearby -- that it might well be overlooked in a typical office setting. And that's where it is headed . . . for starters.

Backed up by an extensive set of software called the Burroughs Business Management System (BMS) library, and available immediately, the new computer will fit right into the niche that is one of the remaining virgin markets for computer manufacturers -- small business (EDP/IR Mar.7,1973). In addition, it fills out the Burroughs product line:

Product	Purchase Range	Average	Lease ($/Mo.) Range	Operating Mode
L 8000	$13K - $ 50K	$ 25K	$ 355 - $1,000	Operator Directed and Batch
B 700	$42K - $110K	$ 50K	$ 950 - $2,600	Batch, Interrupt/ Resume
B 1712/14	$70K - $200K	$100K	$1,500 - $4,500	Batch, Multiprogramming

Burroughs has several thousand salesmen who now (or soon will) know the equipment, and a base of some 60,000 "L" and "TC" series machines. In addition, the company is quick to point out that it has another 400,000 accounting machines in operation. Many of these are potential fodder for the B 700 mill.

The machine has more potential, however. Technically, it is a microprogrammed processor in which a set of microinstructions -- called an interpreter -- controls the processor functions. The B 700 is truly a virtual machine, becoming a special-purpose computer for each job it runs. (When it is "compiling," the computer keeps up with what instructions are needed, then puts only those into its repertorie for the job. Thus, when sorting, the B 700 becomes a sorter and uses 4,000 fewer bytes of memory than when it is a Cobol machine. This makes maximum use of the 32K or 48K 500-nanosecond memory.)

At some point, of course, other configurations will be announced. Communications already is promised, and EDP/IR certainly expects to see displays added and more "intelligence based" products announced. But first, Burroughs says users want accounting functions with report writing and interrupt capability. With its BMS software libraries full of hundreds of programs, Burroughs is ready for business.

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CORRECTION: In reporting the formula for determining how long one of IBM's four-year leases must be extended when a feature is added (EDP/IR Mar.7,1973), we erred. The number of months a lease must be extended, from the time of an upgrade on the same CPU, is determined by:

a) Calculating new total payable (new monthly charge x 48)
b) Calculating amount already paid (old monthly charge x months used)
c) Subtracting b) from a)
d) Dividing by the new monthly charge.

EDP/IR regrets this, and hopes the above will clarify calculations.

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From Federal Court

IBM'S WRISTS SLAPPED, BUT JUSTICE TO GET NO DATA BASE ASSISTANCE;
DOCUMENTS ITEMIZE IBM'S R&D SPENDING WITH CDC IN ANTITRUST SETTLEMENT

> *. . . the court does not mean to suggest that it views IBM's violation of this court's order lightly. Indeed, such unseemly behavior coming as it does from respected members of the bar of this court is particularly distressing. There appears to be no sound reason why counsel needed to act in this hasty manner. Prudence should have dictated a different course.*
>
> -- David N. Edelstein, Chief Judge

But IBM "procured the destruction of a data base created by attorneys for Control Data Corporation," the Court found in the complaint brought by the Justice Department in the Southern District Court of New York.

"Yet . . ." the Judge wrote in a memorandum accompanying Pretrial Order No.7 settling the latest dispute, "if the materials, after reconstruction, were found to be work product, the Government would have been granted relief to which, clearly, it is not entitled." So, the order simply required IBM to:

+ "Provide promptly" copies of any or all materials in its possession or control needed or useful in reconstructing or restoring the index;

+ "Produce immediately" any elements of the index "that it did not cause to be destroyed."

That sounds to EDP/IR more or less like a mother-to-child admonition to "Spit it out!" when the last bite of cake is disappearing. On the other hand, Judge Edelstein's tone was stern, and the memory of this episode might linger when matters finally get moving in U.S. vs IBM. The Judge is pressing rather hard on that score, as well.

Clarification of the CDC/IBM settlement

At the hearing which led up to the order, the Justice Department introduced into evidence the details of the CDC/IBM settlement (EDP/IR Jan.19,1973). One of the documents was a description of the four research and development projects CDC will be performing for IBM during the next five years. The budget allocations and descriptions are worth consideration:

APPROXIMATE BUDGET FOR CDC RESEARCH PROJECTS IN IBM SETTLEMENT ($ Millions)

	1973	1974	1975	1976	1977	Total
Project I -- Magnetic Storage	$1.5	$1.5	$1.5	$1.5	$1.5	$ 7.5
Project II -- Transaction Software	1.2	1.2	1.0	.9	.7	5.0
Project III -- Terminal Development	1.6	1.4	1.4	1.5	1.6	7.5
Project IV -- Data Services Network	1.7	2.1	2.1	2.1	2.0	10.0
TOTALS	$6.0	$6.2	$6.0	$6.0	$5.8	$30.0

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Project I already sounds like a giveaway, since it asks CDC to "determine how far the magnetic storage technology can be pushed beyond today's 3330." In light of the 3340 (page 2), it sounds as if IBM is double checking "the CDC competence in plated and other media" noted as the "basis of this thrust." In any event, the objective is for CDC to "extend the media as well as the head, the magnetic recording system, and the actuator technology so as to develop, on a five year time scale, the most advanced magnetic memory product component technology possible." Purpose: focus on technology, not a commercial product.

Project II sounds more helpful to CDC's service operations, since it is for an advanced transaction software system, using the brokerage community in the 1975-1985 timeframe as the primary application example. It should "integrate order entry by registered representatives, order switch and match, market data (including quotes, listings and projections), cage operations and back office operations. The project is to be generally directed toward software technology, but hardware feasibility work may be involved. CDC is to point toward prototype implementation.

Project III is right down the information appliance road, asking CDC to look into modules that might be configured into total terminal subsystems that meet the needs of terminal users at a minimum cost. "The study will include investigations of keyboard, display, controller and interfacing technologies, but will not include investigations into electromechanical peripheral storage devices except for interfaces. Specific technology to be investigated may include gas panel displays, character recognition hardware and subminiature processors.

Project IV, with the heaviest and growing funding, sounds "right on." It asks CDC to "study the concepts and technology implications of a geographically dispersed multi-mainframe network, offering lowest cost terminal oriented end use for data services customers. The project will determine the end use requirements, produce alternative system designs, and prove feasibility of communication devices, procedures and software.

"In order to achieve the maximum utility of the network, systems of differing architecture will be included with one objective being that of providing transparency. Specific subtasks which may be explored are an advanced low cost communications front-end subsystem; network communications on very large multi-terminal systems; (this will include among others interfacing System 3/7 and small 360/370 systems to large distributed networks); attendant data security procedures necessary in large network systems. Certain technologies in message switching, networking, system monitoring and pattern recognition may be pursued.

"Equipment purchased or leased by CDC from IBM in furtherance of this Project shall be on the same terms, conditions and delivery schedule as equipment supplied by IBM to third parties."

You take the high road and . . .

It almost sounds like IBM and CDC are teaming up to take over! Seriously, the projects sound almost like the description of future information processing that EDP/IR has painted more than once; what's funny, of course, is that IBM, in the settlement, agreed to stay out of the data services business, in the U.S., for six years.

Maybe it has plans to use the technology internationally, where no holds are barred and CDC is reportedly negotiating for the ITT service operations. And there

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are obvious benefits to IBM in the hardware, especially in making sure the "multi-mainframe" network accepts 370. And, according to the contract, "both parties will have rights to the technology developed, which will also be available from Control Data to others in the industry on a license basis." Worth thinking about.

The whole thing could be fun and games, asking CDC to reinvent the wheel. But EDP/IR doubts this. The concepts are too real . . . and there's still the rest of the world. We wouldn't write this R&D off as simply penalty payments!

NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

COMPANY	*PRIMARY ACTIVITY*	*TERMS*	*UNDERWRITER*
ADVANCED MEMORY SYSTEMS 1276 Hammerwood Ave. Sunnyvale, CA 94086	Semiconductor memory products for digital systems	463,500 shares common, 150,000 by the company and 313,500 by certain other shareholders. Net proceeds will be used to repay short-term bank debt and for other corporate purposes.	E.F. Hutton & Co., Inc. One Battery Park Plaza New York, NY 10004
CADCOM, INC. 2024 West St. Annapolis, MD 21401	Computer-related services	100,000 shares common, to be offered for sale at $6 per share. Net proceeds will be used for working capital and other corporate purposes.	Hay, Fales & Co., Inc. 50 Broadway New York, NY 10004
COMMCO, INC. 804 Brown Bldg. Austin, TX 78701	CATV systems	200,000 shares common, to be offered for sale at $7 per share maximum. Of the proceeds, $300,000 will be used to purchase electronic equipment and coaxial cable and the balance for working capital and other corporate purposes.	Levine & Weissman, Inc. 40 Exchange Plaza New York, NY 10005
CONTROL DATA CORP. 8100 34th Ave. Minneapolis, MN 55420	Mainframe computer manufacturer	140,000 shares common, 100,000 of which were issued in connection with acquisitions, 10,000 may be offered from time to time by certain shareholders and 30,000 are issueable in connection with the company's acquisition of common stock of Ticketron, Inc.	
DECISION DATA COMPUTER CORPORATION 100 Witmer Rd. Horsham, PA 19044	Card equipment manufacturer	500,000 shares common, 400,000 by the company and 100,000 by certain shareholders. Proceeds will be used to finance equipment leased to customers and foreign operations, to repay short-term indebtedness and for working capital.	Bache & Co. 100 Gold Street New York, NY 10004
ITEL CORPORATION One Embarcadero Center San Francisco, CA 94111	Computer leasing	300,000 shares common, in connection with the proposed acquisition of FNIC Investors, Inc.	
TERADYNE, INC. 183 Essex St. Boston, MA 02111	Electronic component test equipment	270,000 shares common, to be offered for sale by certain shareholders (including 250,000 by Nicholas DeWolf, board chairman).	Lehman Brothers One William Street New York, NY 10004
HONEYWELL FINANCE, INC.	Correction	The new format for this section (EDP/IR Feb.19,1973) brought with it an old, old item. Honeywell Finance hasn't had a new issue in over a year; apologies for any problems caused by the very outdated item.	

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Review and Forecast

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" MARCH 30,1973 • VOL.8,NO.11 P.J.McGOVERN,EDITOR

Toward rational growth

SHIPMENTS UP 24% AS TELEPROCESSING GROWTH PHASE BEGINS

A lot of catch-up buying by users combined with the product cycle upswing, business recovery and its associated larger processing burden, and the start of a new, teleprocessing growth phase to make 1972 a healthy one for the computer industry.

Total revenues of U.S.-based computer companies, as measured by International Data Corporation, publisher of EDP Industry Report, were up almost 17% (page 4) to the $14.5 billion level. This isn't a return to the 30% days of the late 1960s, but it's a far sight better than the 10% level hit in 1969, 1970, and 1971.

What's most important, the rate should continue. Computer using management has begun to budget for long-touted teleprocessing applications, and this spending -- part of long-range plans at major companies -- should continue into the late 1970s, at least. It will affect almost every sector of the industry, and push total revenues to $28.6 billion -- twice that of 1972 -- by 1977.

Based on IDC surveys of user intentions, discussions with suppliers, and general examination of industry developments, EDP/IR once again has prepared its Review and Forecast of the computer industry. There's finally a true air of optimism, as this issue describes. Highlights of the year past and the times ahead indicate the broad nature of the industry's more rational growth expectations:

- As computer shipments grew almost 24% to the $8.9 billion level last year, the heavy replacement cycle peaked (page 3). The 60% "discontinuance" level in 1972 cleaned house in the rental base; so for the next several years, retirements will hover at the 40% level and net shipments can grow.

- Shipments of dedicated application computers (including minicomputers) zoomed up 55% to $560 million last year. Part of this was catch-up buying (page 9), but EDP/IR sees no dearth of mini applications. Revenues to suppliers should reach $1.7 billion by 1977.

- All signs are encouraging (page 11) for computer industry segments most closely related to teleprocessing -- remote services and terminals of all types. IDC expects almost one million computer terminals to be operating in the U.S. by yearend 1977.

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- Total user spending topped the $20 billion level in the U.S. last year and will grow tranquilly at 12%, disturbed by no single development. The portion of budgets spent with outside vendors was 55% in 1972 and should increase to 56.5% by 1974. This seems to reflect IBM's pitch for virtual storage: Spend on hardware, save more in "people" costs.

IBM's computeryear

Indeed, most of the important industry developments in 1972 emanated from Armonk, or at least White Plains. There were some important reactions to IBM's extremely aggressive attack mounted in its "new approach to computer economics," but most mainframers ambled along, introducing new or improved-performance versions of mature product lines . . . concentrating on profits. Most were successful. Burroughs, continuing to ignore IBM's "leadership," brought out the only really new products and laid plans to push computers further down into the small business segment of industry.

But IBM certainly set the pace . . . in economics, as has come to be expected, and technologically as well:

- In August (EDP/IR Aug.15,1972), the real System/370 stood up. IBM essentially said that virtual storage was the way it had selected for users to move into teleprocessing and large data base usage.

- The prospect of increased hardware function bundling -- of making the CPU a set of many processors, as it were -- came through as the central theme of the 370/125 (EDP/IR Oct.6,1972) and the 370/115 earlier this month. In larger computers, multi-processors are now available and will probably become the standard.

- Low-cost and vast semiconductor memories will support the two new directions described above. Also, IBM seems to be making a firm stand to keep this CPU element (as it prices memory) out of the hands of the independents.

- A new generation of disk drives, announced at the same time as the 370/115, appeared with the introduction of the 3340. With heads inside the pack -- and details not announced -- this "Winchester" drive brings lower cost secondary storage to users and presents new challenges to independent peripheral and supplies manufacturers alike.

- With its announcement of the 3740 diskette data recorder (EDP/IR Feb.19,1973), IBM finally moved away from the punched card and accepted a new approach to data entry. Although this move could be described as following an industry trend, IBM has done it in such a way as to promote remote processing and perhaps set new standards.

- Finally, but perhaps of most consequence to industry participants outside the mainframe sector, IBM has quietly shifted its ground-rules for equipment acquisition, promoting longer term commitments on the part of users -- "lock in's," if you will. The extended term lease plan offered with all new peripherals requires a two-year commitment (and carries a stiff cancellation penalty) but provides the same purchase-to-monthly payment ratio as older rental prices. The four-year term lease eliminates overtime charges.

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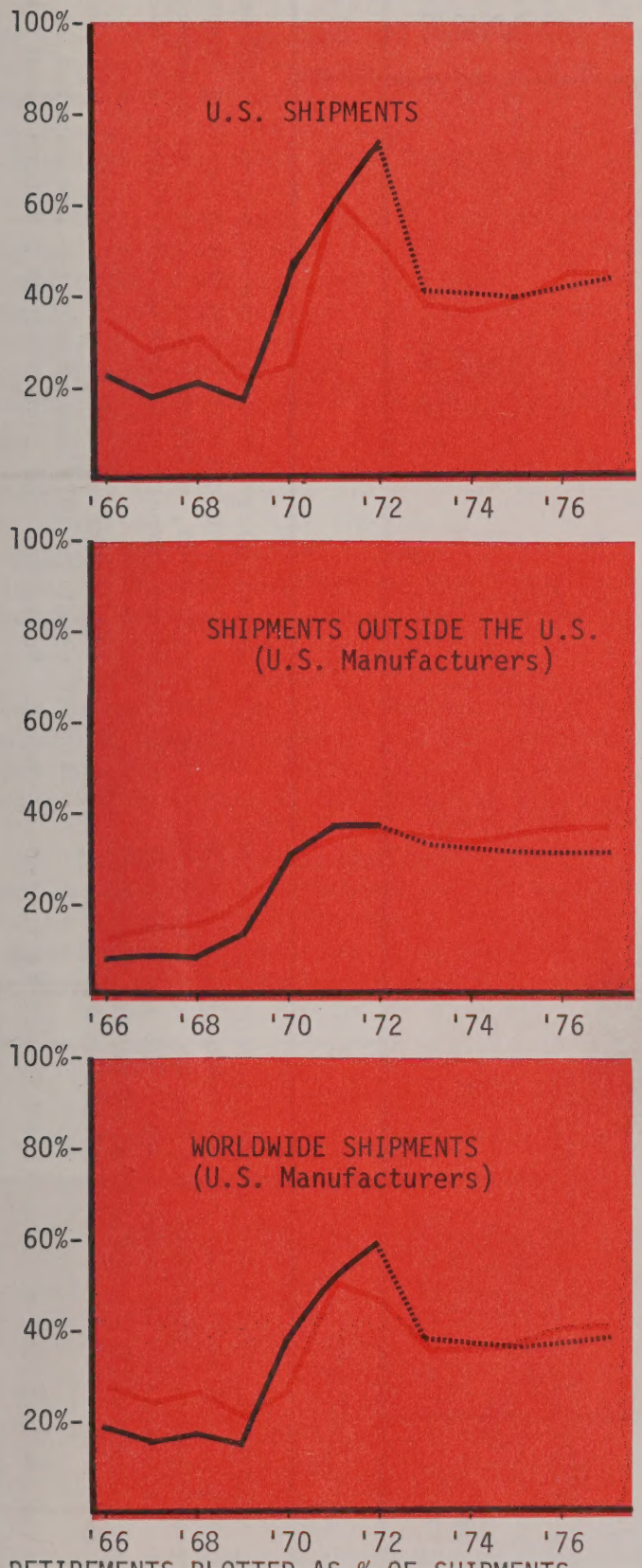
MASSIVE RETIREMENT CYCLE DECLINING AS SHIPMENTS APPROACH A 'NORMAL' MIXTURE



RETIREMENTS PLOTTED AS % OF SHIPMENTS; GOOD SIGN FOR OUTLOOK OF RENTAL YIELDS

"DISCONTINUANCES" was the IBM word when equipment "retirements" leaped up to the 60% level in the U.S. -- nearly 50% when measured on a world-wide basis -- back in 1971 (graphs).

Whatever you call it, it spells trouble in a rental industry. In simplest terms, the phenomena means that equipment is manufactured, then shipped to users simply to replace an item that is already producing revenue for the manufacturer.

As a result, the cost of manufacturing is NOT offset by additional rentals. The customer benefits, but the manufacturer doesn't add nearly so much new revenue producing capacity for his expended buck. And in massive doses, it hurts.

In the U.S., this 1971/1972 occurrence is blamed on several things. Most important: users gaining additional capacity from new technology without increasing rental payments or doing more for less, through consolidation, sending equipment back to computer manufacturers or other suppliers involved.

Outside the U.S., computer users always seemed to pace progress more carefully and listen to less oversell; they didn't produce nearly the retirement hump seen in the U.S. during 1971 and 1972.

In any event, things seem to have begun to straighten themselves out, and retirements -- as the graphs indicate -- should hold in the range of 35% to 40% of shipments during the next five years . . . increasing a bit as the late 1970s and another computer generation update cycle begins.

By the time this "last generation" of computers arrives, however, the effect won't be nearly so noticeable or hurt so much . . . thanks both to a vastly larger base and smarter users.

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TABLE I -- TOTAL WORLDWIDE REVENUE
ESTIMATED & PROJECTED REVENUE TO AMERICAN-BASED COMPANIES FROM KEY SECTORS OF THE EDP INDUSTRY
($ Millions)

	General Purpose Computers	Dedicated Application Computers+	Independent Peripheral Equipment*	Data Processing Supplies=	Batch and On-Line Services	Contract & Packaged Software	Total
1962	1,210	35	130	530	220		2,125
1963	1,760	60	145	595	265	5	2,830
1964	2,250	75	170	630	295	20	3,440
1965	2,700	90	175	660	355	50	4,030
1966	3,735	110	185	725	425	100	5,280
1967	4,895	175	225	805	530	175	6,805
1968	6,910	240	315	895	715	270	9,345
1969	7,145	355	405	995	940	355	10,195
1970	7,645	375	525	1,020	1,265	440	11,270
1971	8,355	360	665	1,075	1,495	450	12,400
1972	9,740	560	780	1,180	1,795	410	14,465
1973	11,200	750	965	1,300	2,140	485	16,840
1974	12,760	970	1,145	1,420	2,525	560	19,380
1975	14,490	1,210	1,330	1,550	2,980	650	22,210
1976	16,370	1,450	1,530	1,680	3,500	750	25,280
1977	18,400	1,700	1,750	1,830	4,100	860	28,640
1973-1977 Growth	1.9	3.0	2.2	1.6	2.3	2.1	1.98

+ In the past, virtually all dedicated application computers were purchased by the user. In 1972, IBM began volume shipments of its System/7, offered on a rental basis. Later this year, IDC will survey users to establish acquisition patterns; for now, however, all shipments are counted as revenues

* Some independent peripheral equipment is rented by the manufacturer, but most is supplied at OEM prices to other manufacturers or third-party leasing companies for rental. Thus, shipments are counted as revenues and OEM sales to computer systems manufacturers are excluded

= Some disk packs are sold, others rented. Shipments -- 10% of total in 1972 and growing -- are counted as revenues. Packs for the 3340 will be a future question

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On the legal front, also, IBM has fared well during the last 12 months. In July (EDP/IR July 13, 1972) the Phoenix Federal Court threw out Greyhound Computer Corp.'s case against IBM before even hearing IBM's defense. "Size alone does not constitute an offense," the judge said, adding that IBM's lease and purchase pricing activity during the late 1960s was "brought about by economic factors over which [it] had no control." The case has been appealed, but no jury had a chance to voice what might have been interpreted as public sentiment.

Early this year (EDP/IR Jan.19,1973), another weight was removed from the shoulders of the Giant as Control Data opted for an out-of-court settlement. It bought IBM's wholly owned subsidiary, Service Bureau Corp., but received an almost offsetting $15 million reimbursement for expenses in a package that has been variously calculated to be worth $100 million to CDC. IBM also promised to stay out of the service business in the U.S. for five years, but got CDC to erase the magnetic tapes on which a comprehensive index to IBM documents was contained.

The Justice Department squawked about the tape erasure . . . and the Federal Court of the Southern District of New York slapped IBM's wrists for insisting on this action . . . but the index is gone. As a result, the Justice antitrust suit against IBM is probably a year or two away at best. Many observers think this is exactly the goal IBM had in mind, and that some settlement -- in the form of a consent decree -- will be worked out before the case can come to trial.

And so the only other significant legal matter facing IBM at the moment is the Telex case involving the pricing of peripheral equipment. It is still scheduled for trial in April, but EDP/IR believes it will be settled or appreciably postponed. This could also be IBM's view, as well, considering the increasingly aggressive stance it is taking in the peripheral area.

So with discontinuances under control, a new line of equipment announced and moving into volume production, and legal matters progressing in what appears to be a "comfortable" manner, IBM looks tough in the marketplace. About the only consolation to competitors is that the cards have been dealt.

STATUS OF WORLDWIDE COMPUTER MARKET FOR U.S.-BASED MANUFACTURERS

	1972 Shipments: $M	% Total	In Use Yearend 1972: $M	% Total	1971-72 % Change
IBM	5,845	65.2	28,475	63.5	+ 6
Plug-Compat.	410	4.6	1,180	2.6	+ 33
HIS	745	8.4	4,470	10.0	+ 14
Univac/RCA	485	5.5	3,415	7.6	+ 7
Burroughs	425	4.8	2,015	4.5	+ 15
CDC	255	2.9	1,870	4.2	+ 15
NCR	215	2.4	1,090	2.4	+ 22
DEC	195	2.2	690	1.5	+ 46
Others (including minis)	300	3.4	1,625	3.7	+ 25
TOTALS	8,875	100.0	44,830	100.0	+ 10

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The other mainframers -- quiet, but successful

As the table on page 5 illustrates, IBM accounted for only 65.2% of mainframe shipments (including minicomputers) last year. As a result, it lost market share . . . some at its "own" sites as independent peripherals were installed, some to the other mainframers. IBM's installed base was up only 6% even though the industry averaged a 10% increase.

In addition, 1972 was one of unusual purchase activity. Users took their 370s early in the delivery cycle as expected, and another $380 million worth of these computers was purchased by third parties for lease to customers. The result was a five percentage point decrease in IBM's U.S. rental base to the 50% level. And even though this condition would probably have "righted" itself with a gradual shift toward rentals, IBM moved boldly to correct or postpone user purchases. The four-year CPU lease plan -- with its 50% purchase credit provision -- will definitely impair purchase, though to what extent is not yet known.

But that's the IBM side of the story. The other major mainframers proved they could be quite successful by staying relatively quiet . . . offering more versions of existing equipment . . . concentrating on profits . . . and waiting to see how IBM moved in the marketplace. Well, profits they made . . . and IBM established quite a few new groundrules (above). Here's a rundown on the remaining "dwarfs" in the computer game.

HONEYWELL INFORMATION SYSTEMS gave proof that the price/performance revision is a successful route. During 1972, it received some 220 orders for its 6000 series computer -- a revised version of the GE 600 line -- and shipped about 100 systems to customers. And it announced its 2000 series, a further revision of the 200 line that was first delivered ten years ago. But these machines are simply attempts to keep salesmen -- and perhaps customers -- happy until a new line can be introduced. That time is approaching.

EDP/IR expects Honeywell to introduce a true new family of computers by summer of this year. And following what seems to have become industry practice, HIS is expected to unveil two or three CPUs in the middle of the line ($5,000-to-$30,000 per month area), waiting a while before either the top of the line (protected by the 6000) is announced or an attack is made in the low-priced marketplace. HIS's strength is in the middle (see chart, page 7) and its first duty is to protect its base.

The new line is expected to be architecturally different from the 200 series, using an IBM-type 8-bit byte rather the 6-bit character from the 200. It will obviously be designed to fill the dual role of competing with the 370 while offering a relatively easy upgrade or migration route for existing Honeywell customers. Extensive use of microprogramming is thus implied.

In the dedicated application area, where it still ranks third in value of shipments, Honeywell introduced its 700 series with very little fanfare. As an outgrowth of the old Computer Control Division design, it is particularly systems and communications oriented. Many show up as controllers or front ends in 2000 and 6000 systems, and the "mini" could be considered a competitor for IBM's System/7 rather than another entry in the traditional mini market (page 9). So once the new line is introduced, HIS will look most like IBM -- in organization as well as product line. That shouldn't really be a shocker to students of the company; for some time it has advertised itself as the "Other Computer Company."

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GENERAL-PURPOSE COMPUTER MARKET -- SHARE BY MANUFACTURER
(% by Number by Price Class, Minicomputers Excluded, U.S. Installations Only)

Price Class	Monthly Rental Range	% Market Share: IBM	HIS	Univac	Burr.	CDC	NCR	Others
Very Small	< 1,250			45.9			54.1	
Small	< 2,500	88.6	1.9	4.5	0.4		2.4	2.2
Small-Medium	< 5,000	56.5	16.7	16.2	-		10.6	
Medium	< 10,000	42.9	11.9	6.5	19.8	1.3	16.4	1.2
Medium-Large	< 20,000	72.9	12.0	5.9	5.1	0.6	0.6	2.9
Large	< 40,000	62.6	7.4	15.3	5.6	3.7	0.6	4.8
Very Large	< 80,000	74.1	3.5	13.0	2.0	6.7		0.7
Extra Large	> 80,000	69.8	13.3	0.2	0.4	16.3		
Total (by number)		66.2	9.3	10.6	3.9	0.9	7.5	1.6
Total (by value)		70.2	8.9	8.5	4.7	3.6	2.5	1.6

UNIVAC's major feat for 1973 was successful management of the RCA user base acquired when the electronics giant dumped its computer operations. Exceeding all expectations from outside the company, Univac not only retained more than 90% of the RCA users as customers (even though some had "escaped" before Univac appeared as their guardian); it also shipped about $100 million worth of additional equipment to these users.

In the product area, Univac was relatively quiet, announcing a single CPU version of its 1110. This machine, in its multiple-processor versions, has been most popular outside the United States. Six of the eight installations at year-end were overseas. Of the two dozen or so currently on order, half are slated for delivery in Japan. Most observers have expected a small, System/3 class computer from Univac, and the delay in its announcement is attributed to the emphasis on financial -- not simply product -- planning within the organization. The EMR-Computer subsidiary of Schlumberger was acquired late in 1972, and this might serve as a base for small business computers plus communications controllers.

BURROUGHS received quite a blow to its prestige -- but little else -- when it "lost" the Barclay Bank account. The equipment had been purchased . . . and it's still there . . . and none of Burroughs' important banking business in the U.S. was contingent on the highly sophisticated system planned in Britain. And on the other side of the status coin, the company shipped the huge Illiac IV to Nasa's Ames Research Center and described the system as "the largest and most powerful computer ever to be constructed." This won't result in much commercial fallout, either, but at least one more system is expected to be ordered.

Futures for Burroughs are tied, to a large extent, to the two product lines introduced during the last year. Both the 1700 and 700 are highly sophisticated from a technical point of view, but almost transparent to the business user for whom they are being marketed. With these machines . . . and its vast library of software packages for business . . . and its large installed base of accounting equipment (EDP/IR Mar.19,1973), Burroughs hopes to penetrate the three lowest price classes shown on the above chart. It's entry level computer business for the company, but it's ripe territory -- partially opened by IBM with System/3,

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partially already in the company's base, much as IBM's punched-card installations for years supplied an entry for the computer salesman.

And though the B 700 was initially announced as an accounting machine type product and pegged in between Burroughs' L series "commercial mini" and the 1700, it is virtually certain to show up in other configurations. Communications capabilities have been promised, and indications are that the 700 will form the heart of a line of "super-smart" remote terminals. The market for such products is vast among the many organizations moving to communications networks for processing.

CONTROL DATA's surprise settlement with IBM is a strong indication that the maker of "the world's largest computers" has decided that services is the route to future success in the computer industry. As a mainframer, its stature isn't the best -- aging product line . . . star designer (Seymour Cray) off doing his own thing . . . Star computer kicked out of General Motors with prospects at best of another Government order or two.

But after being catapulted overnight into the Number One spot in the services industries (EDP/IR Jan.19,1973), and getting a cash infusion from IBM as part of the bargain, CDC's future looks bright. Not much yet has come out of its joint venture (Computer Peripherals) with NCR, but there's a chance for some hot terminals to connect to its Cybernet of large computers. And the relative makeup of the two companies' product lines (page 7) still indicates that much could be gained from closer cooperation.

Meanwhile, CDC is developing its position as a plug compatible peripheral supplier, buying 360/370 add-on memories OEM from Fabritek and AMS to supplement its own disk drive designs. And it is selling computers abroad. Some 50% of CDC's 1972 shipments were outside the U.S.

NATIONAL CASH REGISTER suffered the pains of reorganization in 1972 as it stepped up its conversion from mechanical equipment to electronic terminals. It had layoffs, took a $70 million writeoff, and elected a new president. Otherwise, the company had a fine year.

NCR moved into a second stage with its Century family, introducing price/performance improvements so typical of most other mainframers. The top-of-the-line Century 300 was moving well. Quite obviously, NCR couldn't afford to be without its mainframe computer business.

And the company is making great strides with its automated transaction processing hardware. Efforts in the emerging POS market (EDP/IR Nov.6,1972), for example, were capped earlier this month by a $60 million order from Montgomery Ward. How can you beat "the largest single order ever written with any customer"?

DIGITAL EQUIPMENT CORP. doesn't derive a large portion of its revenues from the general-purpose sector of the computer industry . . . yet. But its shipments approached $200 million in 1972 and EDP/IR feels this qualifies DEC as a "dwarf." The company is still feeling its way in the general-purpose arena, however.

Upon purchasing an RCA memory plant last year, DEC up and cut prices on its DecSystem 10 line. Asked whether the money wouldn't better be used in general-purpose software, a company spokesman replied that DEC charged for that. But it is getting its feet wet . . . and with the PDP-11 series, it has a family that runs the gamut from OEM component to medium-scale system. DEC will learn.

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DEDICATED APPLICATION COMPUTER SHIPMENTS UP OVER 50% IN 1972; AVERAGE SYSTEM VALUE HOLDING IN $30K RANGE DESPITE PLUNGE IN OEM PRICES

All the elements for a booming market combined in 1972 to push shipments of dedicated application computers -- mostly minis -- up 55% to the $560 million level and set the pace for continued rapid growth during the next few years:

- Pent-up user demand was unleashed as budgets loosened and the Phase II investment tax credits could apply;
- IBM began volume shipments of its System/7, broadening the market base rather than increasing competition for the same dollars;
- OEM manufacturers and systems houses further broadened the demand for minis as these sophisticated function boxes began to show up in terminals, machine tools, and small business systems.

As a result of all the factors at work, the "average" value of all dedicated application computers shipped remained about the same as in 1971 -- around $30,000 -- and is expected to maintain this level for the next few years. The many offsetting influences in the marketplace are illustrated by the following:

WORLDWIDE SHIPMENTS OF DEDICATED APPLICATION COMPUTERS -- 1972

Price Class	Typical System	No.CPUs	% Total	Avg.$K	Value ($M)	% Total
Less than $25K	Nova;PDP-8/E	9,400	50.0	14	133	23.8
$25 to $50K	PDP 8/I,11/20	7,940	42.2	35	278	49.6
$50 to $100K	IBM System/7	1,200	6.4	75	90	16.1
Over $100K	SEL; GE/PAC	260	1.4	225	59	10.5
TOTALS		18,800	100.0	30	560	100.0

For a large minicomputer supplier, such as Digital Equipment, the same factors influence the shipment mix; thus, market share tends to be the same whether measured on a numbers or dollars basis. Results of other companies, however, reflect current product offerings (Microdata and IBM, below, illustrate extremes). Here's a company breakdown of 1972 dedicated application computer shipments:

Company	# Units	% Total	$M Value	% Total
Digital Equipment	5,550	29.5	174	31.1
IBM	1,275	6.8	70	12.5
HIS	700	3.7	60	10.7
Hewlett Packard	1,335	7.1	45	8.0
Data General	2,070	11.0	30	5.4
Varian	965	5.1	17	3.0
General Automation	800	4.3	16	2.9
Systems Eng. Labs	105	0.6	16	2.9
GE/PAC	115	0.6	15	2.7
Interdata	535	2.9	13	2.3
Computer Automation	700	3.7	8	1.4
Microdata	1,400	7.4	7	1.3
Others	3,250	17.3	89	15.8
TOTALS	18,800	100.0	560	100.0

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And minicomputer shipment growth doesn't stop with a banner 1972. As the IDC estimates (page 14) detail, 1972 simply made up for 1971's relatively poor 13% growth. Without the recession, each of these years probably would have shown growth rates in the 40+% area.

Why the growth? See above. The traditional mini suppliers offer "bare bone" boxes that bring computing power for only a few thousand dollars. Some observers think the microcomputer, the proverbial "computer-on-a-chip," will replace large portions of this market, especially as components in terminals. But the software and support available with small minis will keep their applications growing for quite some time. Texas Instruments, as if to cover all bets, is going both ways.

And other factors are at work. IBM sees its "mini" -- System/7 -- as part of a system . . . tying the real world to sensors to host 360s or 370s. Its product is sold on a systems basis, usually to large DP users, and therefore hasn't made inroads into the traditional minicomputer marketplace.

Finally, there are the third parties -- usually systems houses of some sort -- that know some business or industrial application and how to computerize it. These companies concentrate on the application, design appropriate software, and usually by the time the system is sold the hardware is incidental (EDP/IR Mar.7, 1973). So these customers will likely stick with products they know. At any rate, the indicated demand for dedicated application computers is high enough to suggest this will be the fastest growing industry segment during the next five years (page 4). Before that period is over, however, the character of the marketplace will probably undergo vast change.

PLUG COMPATIBLE PROSPECTS 'GOOD,' BUT ARMONK CONTINUES TO TURN THE SCREW

Depending on his orientation, an observer could term the independent plug-to-plug compatible peripheral equipment manufacturers "parasites" . . . "saviours" . . . or almost anything in between. In any event, to retain their status these companies must continue to offer products that 1) are at least functionally transparent to IBM users and computers and, 2) are priced to sell for less than their IBM equivalents. This means product planning is done in Armonk, but specifications aren't released until the equipment is delivered to customers . . . and manufacturing techniques remain a deep, dark secret.

As a result, these companies tend to have a shorter product marketing and manufacturing life (two-to-three years versus four or more for IBM) and in most cases must compensate for lower price by some technique other than manufacturing economies of scale.

In the face of these odds, the plug compatibles as a group have done fairly well. U.S. shipments (about 80% the total) in 1972 were:

	No. of Units	$ Millions
360/370 Main Memory	NA	138
3420 Compatible Tape Drives	3,500	86
3330 Compatible Disk Drives	400	18
2314/2319 Compatible Disk Drives (incl. double density)	2,000	69
1403 Compatible Printers	300	16
TOTALS	6,200	327

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IBM, it seems, is out to make things as difficult as possible for the plug-compatible suppliers. As the preceding table indicates, tape drive manufacturers -- primarily Storage Technology -- were able to move rapidly since the technology until just recently, at least, hasn't been a great deterent. In the disk drive area, things have been tougher. Many independents tried (with moderate success) to wait out the catch-up time for a 3330 equivalent with a double-density version of the 2314. And now that 3330s are about ready to move, IBM has dropped the long rumored Winchester, or 3340 into the picture (EDP/IR Mar.19,1973).

On all these products, the independents must cope with IBM's extended term lease plan -- essentially replacing rent as the standard acquisition method on new peripherals -- that locks out much of the market for two years.

And the memory suppliers aren't getting away unscathed, as events of the last couple of weeks would indicate. Not only does IBM offer highly advanced semiconductor memory; it also seems to be out for a four-year lock via its new no-overtime-charge term lease plan for CPUs. And just last week, it announced a new "inspection charge" for customers with independent memory.

In spite of all this, the outlook for plug-compatible peripheral manufacturers isn't all that bad. Computer users have become more sophisticated, more cost conscious, less tied to old IBM commitments. As a result, IDC sees shipments in the plug-compatible sector increasing some 15% to 20% during 1973 and another 10% to 15% in 1974. There may be a "netting" problem as older products are retired before their expected payout, but the user base probably provides enough demand. IBM has been scrapping 2311s for years, and already seems to be retiring rented 2314s that are upgraded to 3330s.

TELEPROCESSING MEANS GROWTH FOR TERMINALS AND SERVICES ALIKE

Two portions of the computer marketplace are in for fantastic growth during the next several years, yet neither of them stand out in EDP/IR's basic sector forecasts (page 4). They are each part of an area that itself undergoes the tranquility effect discussed earlier. Both are tied to telecommunications; neither is dominated by IBM:

- Terminals of all kinds -- teletypewriter, remote batch; dumb, smart; general purpose, application unique -- will have shipment growth of 20% or so a year. And the U.S. installed base of all terminals will grow even faster -- from $2.8 billion now to over $4 billion by 1974.

- Services, in total, will also grow at rates approaching 20% -- from $1.8 billion in 1972 to the $2.5 billion level by 1974. And the remote services subsector of this market will have growth rates in the 30% range (EDP/IR Sept.15,1972).

The reasons are simple. Communications is the wave of the future in information processing. It's where users are headed . . . inescapably! IDC interviews with large using organizations indicate that many are in the first phases of five- and ten-year development cycles aimed at implementing communications-oriented processing systems. In addition, services are being created to handle specific types of transactions . . . products to implement them. The future of this developing industry is so encouraging that IDC in April will begin publishing a newsletter -- AUTOTRANSACTION Industry Report -- to track it. Reader inputs and inquiries are invited.

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TABLE II

WORLDWIDE COMPUTER MARKET
(U.S.-BASED MANUFACTURERS)

	Number Systems Shipped	Cumulative Number In Use	$ Million Value Shipped	Cumulative $ Billion Value In Use
		TOTAL		
1966	12,100	45,300	$ 3,900	$ 15.9
1967	17,320	61,230	5,460	20.4
1968	17,300	75,785	6,955	26.3
1969	20,300	92,225	7,389	32.6
1970	23,020	111,490	7,145	37.0
1971	28,540	134,310	7,165	40.8
1972	37,350	160,645	$ 8,875	$ 44.8
1973	48,610	199,845	9,900	51.2
1974	58,070	247,945	10,770	58.2
1975	69,435	306,815	11,710	66.1
1976	82,665	376,375	13,050	74.7
1977	96,560	456,595	14,100	84.1
		GENERAL-PURPOSE COMPUTERS (GROUP A)		
1966	10,600	40,100	$ 3,790	$ 15.2
1967	14,570	53,330	5,285	19.6
1968	12,800	63,385	6,715	25.2
1969	12,200	71,925	7,032	31.2
1970	11,820	79,490	6,768	35.3
1971	16,330	90,485	6,805	38.7
1972	18,550	98,520	$ 8,315	$ 42.1
1973	23,610	113,320	9,150	47.8
1974	25,570	129,820	9,800	53.9
1975	27,710	148,140	10,500	60.7
1976	30,880	168,380	11,600	68.0
1977	33,600	190,630	12,400	75.9
		DEDICATED-APPLICATION COMPUTERS (GROUP B)		
1966	1,500	5,200	$ 110	$ 0.7
1967	2,750	7,900	175	0.8
1968	4,500	12,400	240	1.1
1969	8,100	20,300	357	1.4
1970	11,200	32,000	377	1.7
1971	12,210	43,825	360	2.1
1972	18,800	62,125	$ 560	$ 2.7
1973	25,000	86,525	750	3.4
1974	32,500	118,125	970	4.3
1975	41,725	158,675	1,210	5.4
1976	51,785	207,895	1,450	6.7
1977	62,960	265,965	1,700	8.2

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TABLE III

GENERAL PURPOSE COMPUTER MARKET (GROUP A)
(U.S.-BASED MANUFACTURERS)

	Number Systems Shipped	Cumulative Number In Use	$ Million Value Shipped	Cumulative $ Billion Value In Use
		WORLDWIDE		
1966	10,600	40,100	$ 3,790	$ 15.2
1967	14,570	53,330	5,285	19.6
1968	12,800	63,385	6,715	25.2
1969	12,200	71,925	7,032	31.2
1970	11,820	79,490	6,768	35.3
1971	16,330	90,485	6,805	38.7
1972	18,550	98,520	$ 8,315	$ 42.1
1973	23,610	113,320	9,150	47.8
1974	25,570	129,820	9,800	53.9
1975	27,710	148,140	10,500	60.7
1976	30,880	168,380	11,600	68.0
1977	33,600	190,630	12,400	75.9
		UNITED STATES		
1966	7,600	27,100	$ 2,760	$ 10.7
1967	9,670	35,800	3,810	13.8
1968	7,400	41,000	4,645	17.5
1969	6,600	45,700	4,642	21.4
1970	5,040	48,450	4,073	23.6
1971	8,560	54,470	3,975	25.2
1972	10,970	57,730	5,170	26.6
1973	13,030	65,440	5,430	29.8
1974	13,570	73,780	5,700	33.2
1975	14,250	82,810	5,990	36.9
1976	15,670	92,550	6,600	40.7
1977	16,460	102,970	6,900	44.8
		INTERNATIONAL		
1966	3,000	13,000	$ 1,030	$ 4.5
1967	4,900	17,530	1,475	5.8
1968	5,400	22,385	2,070	7.7
1969	5,600	26,225	2,390	9.8
1970	6,780	31,040	2,695	11.7
1971	7,770	36,015	2,830	13.5
1972	7,580	40,790	$ 3,145	$ 15.5
1973	10,580	47,880	3,720	18.0
1974	12,000	56,040	4,100	20.7
1975	13,460	65,330	4,510	23.8
1976	15,210	75,830	5,000	27.3
1977	17,140	87,660	5,500	31.1

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TABLE IV

DEDICATED APPLICATION COMPUTER MARKET (GROUP B)
(U.S.-BASED MANUFACTURERS)

	Number Systems Shipped	Cumulative Number In Use	$ Million Value Shipped	Cumulative $ Million Value In Use
		WORLDWIDE		
1966	1,500	5,200	$ 110	$ 660
1967	2,750	7,900	175	825
1968	4,500	12,400	240	1,050
1969	8,100	20,300	357	1,380
1970	11,200	32,000	377	1,720
1971	12,210	43,825	360	2,105
1972	18,800	62,125	$ 560	$ 2,690
1973	25,000	86,525	750	3,390
1974	32,500	118,125	970	4,285
1975	41,725	158,675	1,210	5,395
1976	51,785	207,895	1,450	6,715
1977	62,960	265,965	1,700	8,245
		UNITED STATES		
1966	1,000	4,000	$ 75	$ 565
1967	2,000	6,000	130	690
1968	3,500	9,500	185	865
1969	6,700	16,100	277	1,135
1970	8,900	25,560	282	1,385
1971	9,350	34,615	245	1,663
1972	15,100	49,345	$ 410	$ 2,107
1973	19,470	68,385	540	2,610
1974	24,600	92,375	700	3,255
1975	31,425	123,150	865	4,045
1976	38,185	159,425	1,020	4,970
1977	45,100	200,525	1,175	6,020
		INTERNATIONAL		
1966	500	1,200	$ 35	$ 95
1967	750	1,900	45	135
1968	1,000	2,900	55	185
1969	1,400	4,200	80	245
1970	2,300	6,440	95	335
1971	2,860	9,210	115	442
1972	3,700	12,780	$ 150	$ 583
1973	5,530	18,140	210	780
1974	7,900	25,750	270	1,030
1975	10,300	35,525	345	1,350
1976	13,600	48,470	430	1,745
1977	17,860	65,440	525	2,225

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GENERAL PURPOSE COMPUTER CENSUS

Counts in the General Purpose Digital Computer (Group A) Census, shown below, are based on the best information available to the International Data Corporation, but are estimates. Computer manufacturers, as a rule, do not directly supply this type of information, and it is only through the use of IDC's extensive data files and other information sources that such estimates are possible. The computers included in Group A comprise the bulk of digital computers (by value) in operation. They are byte or character oriented -- with the exception of large-scale scientific machines -- and are primarily programmed with higher-level languages. In addition to this Census, EDP/IR publishes a Dedicated Application Digital Computer (Group B) Census that includes minicomputers and specialized-purpose machines.

AS OF JANUARY 1, 1973

NAME OF MANUFACTURER	COMPUTER MODEL	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Burroughs	B-100 Series	$ 3,300	8/64	6	-	6	X
	B-200 Series	$ 5,600	11/61	130	83	213	X
	B-300 Series	$ 5,200	7/65	460	70	530	X
	B-500	$ 6,000	11/68	475	450	925	X
	B-1712	$ 1,950	8/72	50	0	50	NA
	B-1714	$ 2,200	8/72	30	0	30	NA
	B-1716	$ 5,300	2/73	-	-	-	NA
	B-2500	$ 8,200	2/67	275	125	400	X
	B-2700	$ 8,700	8/72	17	13	30	75
	B-3500	$ 14,700	5/67	565	340	905	X
	B-3700	$ 21,000	11/72	10	0	10	80
	B-45/4700	$ 28,000	10/71	70	29	99	50
	B-5500	$ 35,000	3/63	105	35	140	X
	B-5700	$ 28,500	12/70	20	5	25	10
	B-65/6700	$ 50,000	11/69	45	40	85	15
	B-7700	$120,000	2/72	2	0	2	5
	Subtotal			2,260	1,190	3,450	235
Control Data Corp.	G-20	$ 19,600	4/61	3	6	9	X
	1604/A/B	$ 42,000	1/60	18	4	22	X
	31/3150	$ 9,000	12/64	91	43	134	X
	3170	$ 17,500	12/70	14	8	22	X
	3200	$ 14,700	5/64	57	43	100	X
	3300	$ 28,800	9/65	110	95	205	X
	3400	$ 23,700	11/64	6	9	15	X
	3500	$ 26,000	1/69	10	15	25	3
	3600	$ 48,000	6/63	20	16	36	X
	3800	$ 53,000	12/65	27	3	30	X
	6200	$ 39,000	11/70	2	7	9	X
	Cyber-72	$ 32,900	10/71	7	14	21	9
	6400	$ 54,000	5/66	60	46	106	X
	Cyber-73	$ 47,000	3/72	6	14	20	12
	6500	$ 68,000	12/67	17	9	26	2
	6600	$115,000	8/64	59	33	92	X
	Cyber-74	$105,000	3/72	2	6	8	6
	6700	$125,000	7/70	2	1	3	X
	7600	$165,000	1/69	10	4	14	X
	Cyber-76	$165,000	3/72	1	0	1	3
	Star-100	$250,000	8/73	-	-	-	1
	Subtotal			522	376	898	36
Digital Equipment Corp.	PDP-6	$ 10,000	10/64	16	9	25	X
	1040/1050	$ 13,300	10/67-12/71	160	67	227	13
	1055	$ 22,000	12/71	20	5	25	18
	1070/1077	$ 30,000	6/72- 9/72	3	0	3	5
	Subtotal			199	81	280	36
Friden	System 10	$ 2,500	10/70	340	160	500	400
Honeywell Information Systems	Gamma 10	$ 2,500	7/64	0	1,020	1,020	X
	G-5X Series	$ 1,550	1/66	320	2,300	2,620	300
	G-100 Series	$ 4,000	4/66	385	1,740	2,125	X
	G-200 Series	$ 13,700	4/61	225	54	279	X
	G-405/410	$ 9,000	2/68	20	7	27	X
	G-415/420	$ 14,000	5/64	168	200	368	X
	G-425/430	$ 17,000	6/64	68	100	168	X
	G-435/440	$ 22,000	9/65	60	40	100	6
	G-615	$ 55,000	6/69	11	22	33	X
	G-625	$ 65,000	4/65	2	3	5	X
	G-635	$ 80,000	5/65	58	13	71	X
	G-645	$120,000	7/66	3	1	4	X
	G-6030/6040	$ 33,000	6/71	33	35	68	68
	G-6050/6060	$ 46,500	7/71	24	15	39	25
	G-6070/6080	$ 61,500	7/71	6	4	10	7
	G-6180	$100,000	2/74	-	-	-	NA
	G-Subtotal			1,383	5,554	6,937	406
	H-105	$ 2,500	11/71	350	90	440	180
	H-110	$ 2,600	9/68	215	170	385	X
	H-115	$ 5,300	3/70	1,025	300	1,325	230
	H-120	$ 4,600	1/66	580	210	790	X
	H-125	$ 7,900	12/67	125	325	450	X
	H-200	$ 6,400	3/64	575	275	850	X
	H-2020	$ 2,350	2/73	-	-	-	NA
	H-2030	$ 5,050	1/73	-	-	-	NA
	H-2040	$ 9,000	4/72	96	32	128	95
	H-1015	$ 12,500	4/71	100	45	145	40
	H-2050	$ 14,100	4/72	54	21	75	55
	H-12/1250	$ 12,000	2/66	380	170	550	X
	H-2015	$ 17,800	2/71	130	40	170	30
	H-2060	$ 18,500	4/72	20	5	25	25
	H-2200	$ 19,600	1/66	135	62	197	X
	H-2070	$ 23,000	5/72	22	3	25	17
	H-3200	$ 26,900	2/70	72	34	106	9
	H-4200	$ 31,000	9/68	39	5	44	3
	H-2088	$ 44,000	4/72	5	1	6	6
	H-8200	$ 73,000	2/69	22	4	26	2
	H-4/1400	$ 13,200	12/61	40	24	64	X
	H-800	$ 28,500	12/60	44	11	55	X
	H-1800	$ 46,000	7/64	7	3	10	X
	H-Subtotal			4,036	1,830	5,866	692
	HIS-Subtotal			5,419	7,384	12,803	1,098

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AS OF JANUARY 1, 1973

NAME OF MANUFACTURER	COMPUTER MODEL	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
IBM	System 3/6	$ 1,530	12/70	1,800	1,300	3,100	1,000
	System 3/10	$ 2,200	1/70	8,700	4,200	12,900	2,900
	360/20	$ 3,700	12/65	6,500	5,250	11,750	X
	360/22	$ 5,800	7/71	1,120	265	1,385	350
	360/25	$ 7,500	10/68	1,750	1,250	3,000	X
	370/125	$ 9,800	4/73	-	-	-	2,900
	360/30	$ 11,000	6/65	4,300	2,950	7,250	X
	370/135	$ 13,500	5/72	970	405	1,375	2,600
	360/40	$ 19,600	6/65	2,550	2,050	4,600	X
	370/145	$ 24,700	7/71	1,270	565	1,835	1,100
	360/44	$ 14,300	7/66	85	85	170	X
	360/50	$ 32,100	8/65	870	640	1,510	X
	370/155	$ 51,700	2/71	1,045	435	1,480	660
	370/158	$ 59,200	4/73	-	-	-	inc
	360/65	$ 69,000	11/65	460	230	690	X
	370/165	$ 89,800	6/71	195	54	249	180
	370/168	$115,500	7/73	-	-	-	inc
	360/67	$112,000	6/66	53	10	63	X
	360/75	$ 94,000	1/66	31	19	50	X
	360/85	$141,000	10/69	7	6	13	X
	360/9X	$150,000	11/67	13	3	16	X
	360/195	$188,000	3/71	16	4	20	]
	370/195	$192,000	5/73	-	-	-	] 14
	1130	$ 2,300	2/66	3,900	2,100	6,000	X
	305	$ 3,600	12/57	1	1	2	X
	1401	$ 3,700	9/60	1,350	1,500	2,850	X
	1401-G	$ 2,300	5/64	130	70	200	X
	1401-H	$ 1,300	6/67	100	50	150	X
	1410	$ 17,000	11/61	115	62	177	X
	1440	$ 4,700	4/63	400	390	790	X
	1460	$ 9,800	10/63	65	47	112	X
	1620	$ 2,700	9/60	390	255	645	X
	7010	$ 26,000	10/63	14	9	23	X
	7030	$160,000	5/61	4	1	5	X
	704	$ 32,000	12/55	1	1	2	X
	7040	$ 25,000	6/63	12	19	31	X
	7044	$ 36,500	6/63	9	14	23	X
	705	$ 38,000	1/56	5	3	8	X
	7070-74	$ 27,000	3/60	113	40	153	X
	7080	$ 60,000	8/61	51	1	52	X
	7090	$ 63,500	8/60	21	11	32	X
	7094	$ 73,400	9/62	57	6	63	X
	7094-II	$ 79,400	4/64	9	1	10	X
	Subtotal			38,482	24,302	62,784	11,704
NCR	Century-50	$ 1,950	2/71	600	0	600	165
	Century-100	$ 2,980	9/68	1,170	780	1,950	]
	Century-101	$ 2,750	10/72	50	0	50	] 150
	Century-200	$ 7,900	9/69	580	330	910	130
	Century-251	$ 10,000	11/73	-	-	-	NA
	Century-300	$ 20,000	2/72	5	5	10	35
	304	$ 10,000	1/60	10	1	11	X
	310	$ 1,000	5/61	24	9	33	X
	315	$ 5,000	5/62	365	375	740	X
	315-RMC	$ 11,800	9/65	56	52	108	X
	390	$ 800	5/61	250	190	440	X
	500	$ 1,100	10/65	875	1,690	2,565	X
	Subtotal			3,985	3,432	7,417	480
Philco	1000	$ 7,000	6/63	15	1	16	X
	210/211	$ 40,000	10/58	11	1	12	X
	212	$ 52,000	1/63	7	0	7	X
Standard Computer Corp.	IC-4000	$ 9,000	9/68	5	0	5	X
	IC-6000	$ 16,000	5/67	3	0	3	X
	IC-7000	$ 17,000	6/69	7	0	7	X
Univac	I/II	$ 25,000	3/51	4	4	8	X
	III	$ 25,400	8/62	41	39	80	X
	SS-80/90	$ 8,000	8/58	30	30	60	X
	418-I/II	$ 13,700	6/63	]	]	]	X
	418-III	$ 19,600	7/69	] 128	] 130	] 258	15
	491/492	$ 27,000	12/61	17	13	30	X
	494	$ 41,400	2/66	51	38	89	X
	1004	$ 1,000	2/63	975	1,000	1,975	X
	1005	$ 1,630	4/66	750	170	920	X
	1050	$ 8,800	9/63	210	140	350	X
	1103/5	$ 35,000	12/50	0	2	2	X
	1106	$ 40,000	12/69	46	63	109	20
	1107	$ 57,000	10/62	10	13	23	X
	1108	$ 68,000	9/65	140	92	232	5
	1110	$ 79,000	6/72	2	6	8	25
	9200	$ 2,300	6/67	1,550	900	2,450	100
	9300	$ 4,050	9/67	850	870	1,720	60
	9400	$ 11,600	5/69	220	225	445	60
	9700	$ 21,000	8/72	8	4	12	30
	LARC	$135,000	5/60	1	0	1	X
	Subtotal			5,033	3,739	8,772	315
	301	$ 6,600	10/60	205	12	217	X
	501	$ 16,100	6/59	28	1	29	X
	601	$ 40,900	11/62	2	0	2	X
	3301	$ 22,700	7/64	68	0	68	X
	Spectra 70/15	$ 4,000	9/65	17	0	17	X
	Spectra 70/25	$ 7,000	9/65	2	0	2	X
	Spectra 70/35	$ 11,800	1/67	135	5	140	X
	Spectra 70/45	$ 22,600	11/65	310	21	331	X
	Spectra 70/46	$ 37,400	11/68	49	1	50	X
	Spectra 70/55	$ 34,900	11/68	10	2	12	X
	Spectra 70/60	$ 40,500	9/70	20	0	20	X
	Spectra 70/61	$ 47,200	3/71	18	0	18	X
	Spectra 1600	$ 3,600	1/69	63	0	63	10
	Series 70/2	$ 11,500	7/71	130	0	130	40
	Series 70/3	$ 18,900	10/71	11	0	11	0
	Series 70/6	$ 29,300	10/71	40	0	40	15
	Series 70/7	$ 36,300	10/71	14	0	14	6
	Subtotal			1,122	42	1,164	71
	Total			6,155	3,781	9,936	386
Xerox	Sigma-5	$ 11,500	8/67	115	35	150	10
	Sigma-6	$ 20,000	11/70	20	4	24	5
	Sigma-6E	$ 6,100					
	Sigma-7	$ 24,000	12/66	75	25	100	X
	Sigma-8	$ 19,000	9/71	5	2	7	3
	Sigma-9	$ 44,000	11/71	7	6	13	6
	940	$ 24,000	4/66	65	3	68	X
	9300	$ 8,500	11/64	35	6	41	X
	Subtotal			322	81	403	24
	TOTALS			57,732	40,789	98,521	14,399

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" APRIL 12,1973 • VOL.8,NO.12 P.J.McGOVERN,EDITOR

New marketplace direction . . . or protection?

FOLLOWING THE LEAD QUIETLY BUT ACTIVELY PURSUED BY MAINFRAMERS, SEVERAL MINICOMPUTER MANUFACTURERS SUBSTITUTE MICROPROGRAMMING FOR SOFTWARE

A never-ending stream of buzzwords flows through the computer marketplace, and the latest batch seems to involve the modifier "micro." As usual, it's misused and misunderstood . . . becoming more so as it makes the rounds and comes out of more typewriters. Microprogramming is no exception.

> *Back in 1951 Maurice V. Wilkes -- designer of Edsac, the first British computer -- proposed the microprogramming concept as an alternative way for "orchestrating" the control system of a computer. Wilkes' paper, in fact, was titled "The best way to design an automatic calculating machine." But at the time, microprogramming was too slow or too expensive.*

The ideas began to show up during the 1960s, in controllers for peripheral devices and even in IBM's System/360, for emulation. But not until recently -- with the availability of low-cost, high-speed read-only storage -- have computer designers had a chance to prove or disprove Wilkes' idea.

It seems to be correct. IBM relied heavily on "variable micrologic" in System/370, despite its reluctance to discuss the subject when the computer family was originally introduced (EDP/IR July 9,1970). More has been said or implied as the Giant announced integrated controllers and virtual storage.

Burroughs openly discussed its use of microprogramming at press conferences announcing "advanced systems concepts" for the smaller members of its computer line -- the B 1700 and B 700 (EDP/IR Mar.19,1973). And HIS, when it makes the expected announcement of its new family of computers later this year, will in all probability disclose that microprogramming brings competition for IBM plus compatibility with older Honeywell and GE computer lines. Likewise, the technique is a natural for the CDC/NCR "Swinger," if and when it is announced (page 3).

But now, minicomputer manufacturers have jumped on the bandwagon. In a recent rash of product announcements . . . accents in the current boom in dedicated application computers (EDP/IR Mar.30,1973) . . . several major mini makers have turned to microprogramming. And their tack has been to open the box, not hide the concept from users. Furthermore, this latest gimmick in a $750 million market may also be a protectionistic maneuver to outflank the microcomputer.

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The threat of such "computers-on-a-chip," as they often are called, may be real a few years hence; it certainly will be closer to reality if, as EDP/IR expects, Computer Automation successfully introduces its "computer-on-a-card" next month. This is expected to be a full-blown minicomputer according to every aspect of the definition . . . except price. Word is the device will have 4K of 16-bit memory expandable upwards, powerful instructions, and a below-$1,000 pricetag in OEM quantities. It won't be microprogrammable by the user, but with a mini at that price, who needs it? It'll bear careful watching.

The OEM market is the prime target for mini manufacturers, as evidenced by recent announcements:

- Microdata recently announced an entirely new family of microprogrammed minis, the 3200 series. Certain models have advanced features for more sophisticated users: a high level programming language said to be an offshoot of PL/1, a "push-down stack" architecture reminiscent of what Burroughs uses in the 6500.

- Interdata, in its new top-of-the-line Model 85, has writeable control store, the same thing IBM uses (and loads via a floppy disk). But this mini maker lets users have access. Thus, if he wishes, a customer can physically alter the makeup of his CPU for better application efficiency.

- Hewlett-Packard introduced its 2100S, a refined version of the 2100A, and made writeable control store standard equipment rather than an optional extra.

And other manufacturers are using microprogramming in one form or another: Varian has its Model 73; Modular Computer, Prime, and even DEC (with the PDP-11) take advantage of the concept; all don't give the user hands on . . . yet.

Why the interest in microprogramming for minis?

Higher level programs are difficult to implement on minis, because compilers and compiled programs demand large amounts of memory. But more and more users want to program in higher level languages such as Cobol or Fortran. As a result, mini makers have found they must tailor their architecture to the language and its compiler, rather than the other way around. Microprograms are designed to accomplish just this.

Prior to the middle or even late 1960s, the cost and speed of most available memory didn't make this approach economical. During the last few years, however, advances in memory and semiconductor technology (lowering of prices) have contributed to microprogramming's rise. And as costs continue to plunge, the use of microprogramming will inevitably increase.

The marketplace is creating forces in this direction, as well. A large portion of minicomputer sales are to OEMs and other "tinkerers" who take a basic processor and modify it to meet their own demands or those of customers. These computer buyers like the ease of programming, speed, and resulting efficiencies of operation. Likewise, since the mini maker usually doesn't have to worry about maintaining a non-standard system, he delights in manufacturing and marketing a "hot" or "state-of-the-art" product. It's all part of the gadgetry syndrome that continues to pervade this still-important portion of the customer base. Indeed, it's to be expected at this point in time.

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MICROPROGRAMMING AND MAINFRAMERS -- THE MAINSTREAM?

There is no doubt that emulators will be of great economic importance to the computer industry in the future, and the fact that they can be provided relatively easily on a microprogrammed computer is an argument in favor of microprogramming as a design method.

Those are the words of Wilkes (page 1) again, in a paper prepared in 1969 for Computing Surveys, a tutorial journal published by the Association of Computing Machinery. The editor compares the paper to James Watson's account of the discovery of the DNA molecule in The Double Helix, calls it "exciting." We agree, and consider a few points worth noting.

Microprogramming 'arrived' with System/360 in 1964, when "all but the largest computer then announced [the subsequently discontinued model 70] had microprogramming based on a read-only memory." Emulation of one computer by another was proposed the next year, and by 1967 "microprogramming appealed to designers" because:

1. It provides economical means whereby the smaller machines of a series can have large instruction sets compatible with those on larger ones.
2. Maintenance aids . . . and special diagnostic microroutines can be provided for the use of maintenance engineers.
3. Emulation is possible.
4. Flexibility exists to provide new features in the future.

That's a pretty good description of System/370 -- as announced and as it has developed. So when Wilkes next defines "firmware" as microprograms designed to support software in various areas, there's cause for consideration.

Microprogramming is a way of putting only the most fundamental instructions in hardware (see text) and using memory to bring these together in combinations or microprograms that are useful to the programmer. Thus,

. . . a design based on microprogramming would enable decisions about details of the instruction set to be postponed until a late stage in the construction of the computer . . . to change, or add to, the instruction set after the machine was completed.

Burroughs, as if to illustrate the theory, disclosed during the introduction of its B 1700 that changes in machine language were made as recently as six months before announcement and demonstration.

It is for reasons such as these -- telegraphs of the future, as it were -- that EDP/IR thinks the new HIS line and the NCR/CDC "Swinger" will rely heavily on microprogramming for the emulation necessary. Burroughs goes so far as to say that "emulation is a normal mode of running for the 1700!"

Advantages quoted by mini manufacturers are: greater flexibility in tailoring systems to specific needs; programming at lower costs with more efficiency; more accurate system checkout and fault detection; easier field changes and expansions at greater economies; and better emulation of other processors and the various types of peripherals that might be needed.

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Microprogramming pros and cons

Microprogramming is a mystery to many. In the most simplistic of terms, it is a way to replace circuits with little programs; it is effective only when these microprograms are put in a control memory, or store, that operates many times faster than the computer's main memory. When the technique was first applied -- and for many applications today -- control store was cost/effective only as read-only memory (ROM), often a semiconductor prepared by the manufacturer. Today, there are ways of using high-speed alterable or read/write memory for this control.

Writeable control stores have more flexibility, and were opted for by mainframers such as IBM with System/370. But the method of writing into them, via a floppy disk, for example, has been controlled by the manufacturer so that he has final say over what instructions the computer can execute. But with some of the new products discussed in this issue, the mini maker has given users the ability to modify control memory. This may be popular for more sophisticated OEM buyers and certain users, but it's not a cureall; there are disadvantages.

For one thing, modifying a system via microprogramming requires users not only well versed in programming but, because of its close relationship with hardware, with computer architecture as well. This is a rare bird, and unless he's careful he can end up with more problems as a result of microprogramming -- even an unworkable system -- than the sought-after improvements in system flexibility.

Additionally, there's the question of control. Who will be permitted access to the control memory to make changes? And, once the system has been changed, how about maintenance and documentation? Since the system no longer looks like the one that left the factory, it's difficult to expect the manufacturer to be able to maintain it without added costs. And what about manufacturer-supplied diagnostics, debugging and other microroutines generally supplied free of charge with the system? Once the control memory is altered, these may be virtually useless.

In sum, with alterable control memory, the user must be ready to commit the necessary time and funds to support what he creates. This may ultimately be more costly to implement and support in a microprogrammed system than to deal with the inefficiencies of a conventional mini; at least, there are tradeoffs.

Who's who in mini microprogramming

As mentioned above, there is a great diversity among minicomputer manufacturers and their use of microprogramming: Some are using it to enhance their position in the marketplace; some offer it more or less as another bell or whistle; many use the technique but keep it to themselves, much like the mainframers.

Microdata, which has utilized microprogramming since its founding five years ago, currently offers three product lines, all microprogrammed. It is perhaps the most active company in expounding the concept and using it to advantage. Its customer base is approximately 90% OEMers who are involved in applications ranging from machine tool control to credit card verification -- specialized areas where microprogramming can be used by the OEM and hidden from its customers.

The balance of Microdata's base consists of major universities that take advantage of microprogramming in teaching computer sciences. Thus, Microdata's customers -- using over 2500 of its computers -- are of the type that generally have the knowhow and talent to cope with advantages . . . and understand the problems.

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Interdata, also a user of microprogramming since it began operations in 1966, has over 1500 installations. It introduced the first microprogrammable computer in 1967, and currently offers six models -- all microprogrammable -- in its "new series." Only one of them, the Model 85, has an alterable control store feature.

Although Interdata began using the concept to provide users more specialized instruction sets, the microprogramming features offered on its Model 3 didn't catch on with users. Primarily, this was the result of the memory technology available at the time. Once the control store was constructed by the manufacturer, difficulties arose when changes were made or during debugging. Microprogramming did, however, provide Interdata's users with a simplified yet fast method of emulating higher level languages.

Currently, Interdata thinks that microprogramming can be most effective for users involved with "repetitive function" applications. Time-consuming mathematical calculations, for example, can be performed three to five times faster with microprogramming than if done with conventional software. So Interdata reports that OEMs -- a major part of its customer base -- and end users with repetitive function applications are now showing interest in dynamic control store.

Hewlett-Packard, rather than taking a lead in advancing the microprogramming concept like Microdata and Interdata, seems to have adopted a wait-and-see attitude. Although writeable control store was offered as an option on its 2100A, few users expressed interest. They seemed to consider microprogramming a "black art," too complex for easy use. So now, in an attempt to encourage its use, HP has made WCS a standard feature of its refined version of the 2100A, the 2100S. To promote the concept even further and attract end users as well as OEMs, the company plans to use the S version in its timesharing and educational systems.

Other mini firms into microprogramming -- Varian, Modular Computer Systems, DEC (with the PDP-11), and Prime Computer -- are using the concept to provide users with greater flexibility, to insure compatibility between models in their product lines, and to stay in tune with the continuing overtures in microprogramming made by Microdata and Interdata.

The future: Competitive forces and . . .

In addition to playing another round of follow-the-leader, mini manufacturers have good business reasons to be interested in microprogramming. This concept may provide protection from purely electronic competition. With the continuing advancements in the computer-on-a-chip approach, it is almost a certainty that, during the next few years, minis will look less and less attractive to OEMs. So to stave off advances from microcomputer giants such as Fairchild, National Semiconductor, and Intel, mini manufacturers have or probably will turn to the flexibility and efficiency of microprogramming.

This concept, "black art," or whatever is here; and if Wilkes is the prophet he seems to be, it's here to stay. Near term, microprogramming seems to be the effective alternative in giving specialized application ability to OEM buyers. And with the microcomputer concept being applied to minis, as the "vibes" from Computer Automation seem to suggest, there may be a shift back to full minis at micro prices. In any event, the days for the traditional minicomputer are numbered, and the microprogramming concept is one alternative. It's also a concept, already in widespread use, that some users . . . some day . . . will demand access to in their general-purpose equipment.

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DEDICATED APPLICATION DIGITAL COMPUTER CENSUS

The following data about Dedicated Application (Group B) computers is based on the best information available to the International Data Corporation, and much of it has been verified by the manufacturers. Comments or corrections should be directed to the attention of EDP/IR's census editor, Walter E. Misdom.

Group B computers, as defined by IDC, include those commonly called mini-computers and certain larger systems usually designed or used for one application, such as process control, data acquisition, or the like. These computers are word oriented (most commonly 8, 12, or 16 bits per word), usually purchased, and predominantly programmed in assembly language or Fortran. They are categorized as:

Price Class 1 -- less than $25,000 average system price;
Price Class 2 -- $25,001 to $50,000 average system price;
Price Class 3 -- $50,001 to $100,000 average system price;
Price Class 4 -- more than $100,000 average system price.

AS OF JANUARY 1, 1973

NAME OF MANUFACTURER	COMPUTER MODEL	NOTES	BITS PER WORD	PRICE CLASS	PURCHASE PRICE ($1,000) BASIC	PURCHASE PRICE ($1,000) AVERAGE	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Apeco	80/20		8	2	29	35	6/70	10 +	0	10 +	NA
	80/30		8	2	32	40	1/70	25 +	0	25 +	NA
	Cascade 80		16		NA		1/70				NA
Autonetics	Recomp-II		40	4	95	127	11/58	30	5	35	X
	Recomp-III		40	3	65	94	6/61	7	2	9	X
Bailey Meter	750		25	4		110	6/60	37	15	52	X
	755		25	4	80	330	11/61	7	0	7	X
	756		25	4	90	150	2/65	15	12	27	X
	855/15		16	2	24	135	12/72	1	0	1	NA
	855/25		25	4	100	400	4/68	16	0	16	X
	855/50			4		400	3/72	12	0	12	NA
Bendix	BDX-6200		20	2	25		5/70	40 +	0	40 +	NA
	BDX-9000		16	1	6		/71	8 +	0	8 +	NA
Bunker Ramo	130		15	3		90	10/61	160	27	187	X
	133		15	4		108	5/64	79	9	88	X
	230		15	4		134	8/63	15	2	17	X
	300		29	4		275	3/59	18	5	23	X
	330		29	4		275	12/60	19	5	24	X
	340		29	4		375	12/63	19	3	22	X
	1018		18	1		23	12/71	NA	NA	NA	NA
Cincinnati Milacron	CIP-2X00	a	8/9	1	4	12	7/69	225	0	225	NA
	CIP-4000		18/20	3		53	4/71	NA	0	NA	NA
Clary Datacomp	404		16	1	6	25	10/69	100 +	20 +	120 +	NA
Collins Radio	8311			1	15	17	1/68	NA	NA	NA	NA
	8400			4		950	11/62	25	5	30	X
	8500		32	4	200	1000	1/67	53	16	69	X
Compiler Systems, Inc.	CSI-16		16	2	11	20	11/70	80	0	80	NA
	CSI-24		24	3	15	30	12/70	30	0	30	NA
Computer Automation Inc.	108/208/808		8	1	5	11	4/68	275 +	25 +	300 +	NA
	116		16	1	8	16	8/70	50	0	50	NA
	216		16	1	8	20	7/69	300	30	330 +	NA
	816		16	1	10	15	12/68	40	5	45	X
	Alpha-8		8	1	3	4	6/72	]			
	Alpha-16		16	1	4	9	9/71	] 540	60	600	NA
	Naked Mini-8		8	1	2	3	6/72	]			
	Naked Mini-16		16	1	3	7	9/71	] 270	30	300	NA
	Subtotals							1,475	150	1,625	NA
Computer Development	CD-2000		8	1	7	10	8/70	NA	0	NA	NA
Computer Logic Systems	CLS-18		18	1	9	14	3/71	NA	0	NA	NA
Computer Signal Processors	CSP-30		16	4	85	120	6/70	10 +	0	10 +	NA
Comten Inc.	10			1		17	7/69	35 +	0	35 +	NA
	20		16+2	3		80	3/71	75	0	75 +	NA
	40		32+4	4	125	240	8/69	22	0	22 +	NA
	60		32+4	4	150	285	6/69	18	0	18 +	NA
Consultronics (Scientific Control Corp.)	600 Series		24	3	31	80	10/65	230	0	230	X
	4700		16	3	15	72	4/69	18	0	18	X
	DCT-132		8	2	28	36	5/69	35	85	120	X
Control Data Corp.	160		12	4	60	112	5/60	49	11	60	X
	160-A		12	4	90	225	7/61	200	65	265	X
	160-G		13	4		535	3/64	35	0	35	X
	924/A		24	4		430	8/61	26	1	27	X
	1700		16+2	4	37	160	3/66	358	97	455	X
	1700-SC		16+2	3	20	60	9/70	140	60	200	X
	8090		12	3		90	5/64	116	89	205	X
	8092		8	3		67	6/64	56	14	70	X
	G-15		29	3		61	7/55	265	18	283	X
	LGP-21		32	2		42	12/62	140	13	153	X
	LGP-30		32	3	49	59	8/56	290	43	333	X
	RPC-4000		32	4	87	101	10/60	61	12	73	X
	CSC-46		21	4		250	/54	10	0	10	X
	CSC-136		25	4		275	/60	4	1	5	X
	CSC-636		15	4		300	10/63	13	2	15	X
	Elbit-100		12	1	6	8	6/67	5	445	450	X
	M-1000		24	4	250	365	/68	20 +	0	20 +	NA
	Subtotal							1,788	871	2,659	NA
Datacraft	6024-1		24	4	51	135	5/69	18	0	18	NA
	6024-3		24	3	32	75	2/70	135	25	160	NA
	6024-5		24	2	13	27	5/72	33	4	37	NA
Data General Corp.	Nova		16	1	8	11	2/69	1,430	500	1,930	NA
	Nova-800/820		16	1	7	10	3/71	450	125	575	NA
	Nova-840		16	2	16	30	6/73	-	-	-	NA
	Nova-1200		16	1	5	9	12/70	1,840	200	2,040	NA
	Supernova		16	1	10	14	5/70	260	260	520	NA
	Supernova-SC		16	1	14	19	6/71	60	20	80	NA
	Subtotals							4,040	1,105	5,145	NA
Datamate Computer Systems	DM-16		16	2	17	26	11/69	12	0	12	X
	DM-70		16	1	9	15	12/70	25	0	25	NA
	DM-70/ROM		16	1	4	6	10/70	NA	0	NA	NA
	ECP-18		18	1	14	15	11/66	21	0	21	X
	2400		24+3	1	15					NA	
Data Technology	1600		8	1	6	22	9/68			NA	NA
Digiac Corp.	3060			1	9	13	1/70	86	0	86	NA
	3080		25	1	20	25	12/64	16	0	16	X
	3080-C		25	2	26	37	10/67	8	0	8	X
Digital Computer Controls	D-112		12	1	4	10	8/70	500	90	590	NA
	D-116		16	1	4	10	11/71	] 550	50	600	NA
	D-216		16	1	8	16	8/71	]			

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Digital Computer Systems	System-32		32	3	60						
Digital Equipment Corp.	PDP-1		18	4	120	136	11/60	37	4	41	X
	PDP-4		18	3		74	8/62	30	3	33	X
	PDP-5		12	2	30	36	9/63	62	29	91	X
	PDP-7		18	3		66	11/64	58	36	94	X
	PDP-8		12	2	18	30	5/65	930	470	1,400	X
	PDP-8e		12	1	5	12	4/71	3,715	1,435	5,150	1,000
	PDP-8f,m		12	1	4	8	1/72	1,100	125	1,225	410
	PDP-8i		12	2	13	28	3/68	2,140	1,060	3,200	X
	PDP-8l		12	1	8	21	10/68	2,690	1,010	3,700	X
	PDP-8s		12	1	10	20	9/66	600	350	950	X
	PDP-8/Linc		12	2	38	48	9/66	82	52	134	X
	PDP-9		18	2	35	50	12/66	285	150	435	X
	PDP-9/L		18	2	20	33	11/68	30	18	48	X
	PDP-11-5, 15		16	1	4	10	4/71	1,440	420	1,860	465
	PDP-10, 20, 40		16	2	9	28	3/70	2,120	670	2,790	340
	PDP-11-45		16	2	15	50	7/72	170	45	215	325
	PDP-12		12	2	13	45	4/69	490	165	655	50
	PDP-15		18	3	15	75	2/70	370	190	560	80
	Subtotals							16,349	6,232	22,581	2,670 +
Digital Scientific Corp.	Meta-4		16	3	21	100	4/70	65	0	65 +	NA
Dynamic Research	DRC-44		24	2		36	7/68				
Eldorado	140/200		8	2	21		1/70	135	0	135 +	NA
Electronic Associates Inc.	640		16	2	27	55	6/67	110	61	171	X
	1020		16	1	20	25	2/64	100	25	125	X
	8400		32	4	200	450	6/65	19	6	25	X
	Pacer-100		16	2	15	40	5/72			NA	NA
Electronic Processors Inc.	EPI-118		18	1	6	14	3/71	NA	0	NA	NA
	EPI-218		18	1	3	10	10/72	NA	0	NA	NA
EMR	210		21	4	94	132	4/62	9	0	9	X
	420		42	4	324	450	6/63	3	0	3	X
	2100		21	4	65	143	12/63	8	0	8	X
Foto Mem, Inc.	Centauer-100		8	1	6	20	4/70	18	0	18 +	NA
Four Phase Systems	IV/70		24	2	16	60	3/71	280	0	280	NA
Foxboro Co.	Fox-1		24	4	95	260	10/72			NA	NA
	Fox-2		16	2	21		9/72			NA	NA
	2/10		16	3		50	11/72			NA	NA
	2/30		16	4		80	9/72			NA	NA
General Automation Inc.	GA-18/30		16	2	18	50	8/69	155	25	180	NA
	SPC-12		8	1	4	16	1/68	1,525	195	1,720	NA
	SPC-16		16	1	8	25	5/70	450	50	500	NA
GE/PAC	30	b	8	1	7	25	5/69	140	20	160	NA
	312		20	4		200	3/60	27	6	33	X
	412		20	4		300	7/62	39	8	47	X
	3010	c	16	3	13	90	5/70	24	4	28 +	NA
	3010/2	d	16	4	15	140	12/71	NA	NA	NA	NA
	4010		24	4	76	200	10/70	50	6	56	NA
	4020		24	4	79	240	2/67	215	70	285	X
	4040		24	4		120	8/64	45	20	65	X
	4050		24	4		280	12/66	23	2	25	X
	4060		24	4		340	6/65	18	2	20	X
	4070		24	4	300	1000				NA	NA
	Subtotal							581	138	719	NA
GRI Computer Corp.	909 Series		16	1	4	9	1/70	255	45	300	NA
	99/30 & 40		16	1	4	15	6/72			NA	NA
GTE/Tempo Computer	I		16	2	14	36	12/69	90 +	10	100 +	NA
	II		16	1	6	10	1/72	30 +	0	30 +	NA
Hewlett Packard Co.	2000-A	e	16	4	89	101	11/68	156	65	221	X
	2000-B	f	16	4	119	134	8/70	10	2	12	X
	2000-C		16	4	187	205	3/71	27	3	30	NA
	2000-E		17	3	50	75	7/72	20		20	NA
	2000-F			4	110	137	7/72	10		10	NA
	2005-A	g	16	3	72	85	6/69	26	6	32	X
	2007-A	h	16	1	20	20	9/68	43	11	54	X
	2100-A		16	1	10	16	10/68	465	115	580	X
	2114-A		16	1	10	16	10/68	409	109	518	X
	2114-B		16	1	9	15	11/69	525	140	665 +	NA
	2115-A		16	2	15	26	11/67	267	65	332	X
	2116-A		16	3	22	32	11/66	88	17	105	X
	2116-B		16	2	24	40	9/68	650	162	812	X
	2116-C		16	2	20	45	11/69	460	50	510	NA
	3000		16	4	100	170	9/72	12	0	12	NA
	Others							470	117	587	NA
	Subtotal							3,638	862	4,500	NA
Honeywell	19		19	4		140	5/61	3	0	3	X
	21		20	3		63	2/66	41	25	66	X
	24		24	4		200	5/63	82	3	85	X
	112		12	1	5	10	11/69	222	48	270	X
	116		16	3		65	4/68	172	35	207	X
	124		24	4	65	130	3/66	109	18	127	X
	224		24	4	75	380	3/65	55	8	63	X
	290		18	4		175	11/60	10	2	12	X
	316		16	2	8	45	6/69	1,290	450	1,740	NA
	324		24	4	175	250	7/68	12	0	12	X
	416		16	2	17	43	4/67	198	130	328	X
	516		16	3	24	95	10/66	865	285	1,150	NA
	632		32	4	97	450	12/68	10	4	14	X
	700 Series		16	3	19	53	6/72	150	50	200	NA
	164X Series	i	16	4	144	440	12/69	20	6	26	X
	Subtotals							3,239	1,064	4,303	NA
IBM	1710/1720		6	4		225	2/62	8	12	20	X
	1800		16+2	4	47	235	2/66	645	410	1,055	X
	System/7		16	3	17	55	9/71	850	150	1,000	800
	Subtotal							1,503	572	2,075	800
Imlac	PDS-1		16	1	10	11	2/70			NA	NA
Information Technology Inc.	4900/5		8	1	3	5	10/70			NA	NA
	4900/10		16	1	10	20	10/65	25	0	25	X
	4900/20		12/32	2	30	50	10/69	10 +	0	10 +	NA
Infotronics	Mini/Maxi		16	1		25	7/70			NA	NA
Intel	MCS-4		4/8	1		NA	6/71			NA	NA
	MCS-8		8	1	1	NA	1/72			NA	NA
Interdata	1		8	1	4	11	12/70	245	100	345	NA
	2		16	1	9	11	7/68	20	0	20	X
	3		16	1	13	20	5/67	200	0	200	X
	4		16	1	17	21	8/68	300	125	425	X
	5		16	1	11	25	11/70	70	20	90	X
	15		16	2	22	35	1/69	40	24	64	X
	16/18		16				5/71	3	11	14	X
	50		16+1	1	7	23	5/72	20	4	24	NA
	55		16+1	2	16	40	7/72	16	4	20	NA
	70		16	1	7	50	9/71	300	75	375	NA
	74		16	1	4		2/73	-	-	-	NA
	80		16	1	15	23	11/72	10	0	10	NA
	Subtotals							1,224	363	1,587	NA

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AS OF JANUARY 1, 1973

NAME OF MANUFACTURER	COMPUTER MODEL	NOTES	BITS PER WORD	CLASS	PURCHASE PRICE ($1,000) BASIC	PURCHASE PRICE ($1,000) AVERAGE	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Interplex	System-1		16	2		47	9/70			NA	NA
Lockheed Electronics	MAC-16		16	1	11	22	3/69	280	30	310	X
	MAC-Jr		16	1	8	16	11/70	745	85	830	NA
	Sue-1110		16	1	4	8	2/72	55	5	60	NA
Memorex	MRX-40		16	4	91	180	8/72	NA	0	NA	NA
	MRX-50		16	4	104	250	8/72	NA	0	NA	NA
Microdata Corp.	400		8	1	3	4	1/70	120	0	120	NA
	800		8	1	5	8	1/69	525	125	650	NA
	810		8	1	6	10	5/69	355	110	465	NA
	812		8	1	11	15	12/69	265	80	345	NA
	820		8	1	6	13	10/70	345	175	520	NA
	1600		8	1	5	11	2/72	125	25	150	NA
	Subtotal							1,735	515	2,250	NA
Mini Comp	MD-708		8	1	5	7	8/70	25 +	0	25 +	NA
	Administrator-2		16	3	35	52	12/70			NA	NA
	Multi User-E		16	3	67	85	11/70			NA	NA
	Multi User-I		16	3	40	58	1/71			NA	NA
Modular Computer Systems	Modcomp-I		16	1	5	11	10/71	100	0	100	NA
	Modcomp-II		16	2	10	27	6/71	35	0	35	NA
	Modcomp-III		16	3	14	65	12/70	75	0	75	NA
Mohawk (Atron)	501		8	2	8	35	9/69	165	20	185	NA
Monitor Data	MD/708		8	1	3		8/70			NA	NA
Motorola Comm. Div.	MDP-1000		8	1	8	19	2/69	50 +	0	50 +	NA
Nuclear Data, Inc.	ND-812		12	1	7	15	3/71	280	0	280	NA
Omnicomp Computer Corp.	Omnus-1		16	1	7	12	8/71			NA	NA
Omnitec (BIT)	480		8	1	6	17	12/66	195	3	198	X
	483		8	1	9	33	1/70	100 +	35	135 +	NA
Prime	200		16				/72			NA	NA
Qantel Corp.	Qantel-V		8	2	14	26	6/70	125 +	0	125 +	NA
Raytheon Data Systems	703		16	1	13	23	10/67	220	40	260	X
	704		16	1	10	18	4/70	220	80	300	NA
	706		16	2	19	30	5/69	105	30	135	NA
	PB-250		22	2	33	48	12/60	155	20	175	X
	PB-440		24	4		140	3/64	18	2	20	X
	PB-520		24	4		128	10/65	26	1	27	X
	Subtotal							744	173	917	NA
Redcor Corp.	RC-70		16+2	2	15	30	7/68	125	15	140	X
Rolm Corp.	1601	j	16	2	13	28	3/70	105	10	115	NA
Sanders	Series-200		16+2	3		60	3/69			NA	NA
	Series-800		16				12/71			NA	NA
Spear	Microlinc		12	3	46	57	6/66	33	3	36	X
Spiras Systems/USM	65		16	2	19	40	8/69	25	0	25 +	NA
Sys. Computer Corp.	500		8				6/72			NA	NA
	1000		8	1	4		1/71	400	0	400	NA
	1500		8				6/72			NA	NA
Systems Engineering Labs	810		16	2	38	45	9/65	24	0	24	X
	810-A		16	2	18	90	4/67	236	10	246	X
	810-B		18	4	30	150	12/68	162	80	170	X
	840		24	3	65	80	11/65	3	0	3	X
	840-A		24	3	60	75	8/66	36	2	38	X
	840-MP		26	4	49	260	12/67	33	0	33	X
	71		16	2	15	48	8/72	80	20	100	NA
	72		16	2	20	45	9/71	20	5	25	NA
	85		32	4	150	240	7/72	5	0	5	NA
	86		32	4	200	325	6/70	28	3	31	NA
	88		32	4	350	600	3/71	3	1	4	NA
	Subtotal							630	49	679	NA
Tenet	210		32	4		280	8/71			NA	NA
Texas Instruments	960		16+2	2	14	30	6/70	20 +		20 +	NA
	960-A		16+2	1	3		11/71	NA		NA	NA
	980		16	2	17	40	5/68	100 +		100 +	NA
	980-A		16	1	4		/72			NA	NA
Unicom, Inc.	CP-8A		8	1	3		2/70	81	9	90	NA
	CP-8B		8	1	3		3/70	57	6	63	NA
	CP-8C		8	1	5		3/70	103	12	115	NA
	CP-8D		8	1	7		4/70	15	0	15	NA
Unicomp, Inc.	Comp-16		16	2	11	29	6/70	26	0	26	NA
	Comp-18		18	2	12	38	8/70	38	0	38	NA
Univac (EMR)	6130/6135		16+2	4	85	200	3/66	60	38	98	X
	6140/6145		16	4	60	120	/73	-	-	-	NA
	6020		24	4	72	175	4/65	13	3	16	X
	6040		24	4	98	225	7/65	9	1	10	X
	6050		24	4	123	360	2/66	17	6	23	X
	6070		24	4	240	600	10/65	1	2	3	X
Varian	73		16	2	10	36	9/72			NA	NA
	520/i		16	1	6	13	9/68	300	140	440	X
	610		12	1		15	7/64	10	0	10	X
	620		16	2		37	11/65	75	0	75	X
	620/i		18	1	10	20	6/67	1,600	85	1,685	X
	620/f		17+1	1	11	25	11/70	215	35	250	NA
	620/1		16+1	1	5	12	4/71	445	115	560	NA
	R620/i		18	2	14	28	7/68	75	5	80	NA
	R622/i		18	2	15	30	7/68	115	15	130	NA
	Subtotal							2,835	395	3,230	NA
Varisystems	PAC-16	k	16	1	4		9/69	20 +	0	20 +	NA
Wang Labs Inc.	3300 Basic		8	2	14	40	4/71	65	0	65 +	NA
Westinghouse Electric Corp.	P-50		14	1	16	23	8/64	203	19	222	X
	P-250	1	16	3	40	62	9/67	58	10	68	X
	P-500 Series		18	4	85	110	6/63	39	6	45	X
	P-2000		16	2	10	27	8/69	146	39	185	NA
	2500		16	2	10	30	11/71	85	9	94	NA
	Subtotal							531	83	614	NA
Xerox	92		12	3		90	4/65	42	8	50	X
	910		24	4		120	8/62	168	15	183	X
	920		24	4		150	9/62	111	19	130	X
	925		24	4		200	12/64	13	2	15	X
	930		24	4	80	400	6/64	112	18	130	X
	530			3	22	63	8/73	-	-	-	NA
	CE-16		16	1	8	18	6/69	30 +		30 +	NA
	CE-16/A		16	1	15	25	12/69	75		75	NA
	CF-16/A	m	16	1	8	17	11/70	50		50	NA
	Sigma-2		16	4	24	125	12/66	210	40	250	X
	Sigma-3		17	4	28	140	1/70	175	60	235	NA
	Subtotal							986	162	1,148	NA
XLO	XLO-Eight		8	1	4		1/71	50	0	50	NA
TOTALS								51,056	13,814	64,870	

Notes:
a. cross-licensed version of Microdata-800
b. cross-licensed version of Interdata-1
c. cross-licensed version of Interdata-4
d. cross-licensed version of Interdata-70
e. utilizes 2116-B
f. utilizes 2114-B or 2116-B
g. utilizes 2116-B (RTES)
h. utilizes 2115-A or B (Educ. Basic System)
i. utilizes two 316's
j. cross-licensed rugged version of Data General-Nova
k. Mnfr. by Photo Inc.
l. utilizes XDS - Sigma 2
m. utilizes CAI-116

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" APRIL 27,1973 • VOL.8,NO.13 P.J.McGOVERN,EDITOR

Telex fights IBM with IBM records -- page 8

USER SPENDING HITS RECORD $20 BILLION IN UNITED STATES; TELEPROCESSING APPLICATIONS SPUR GROWTH IN MOST COMPUTER INDUSTRY SECTORS

Whenever the conversation turns to the size or growth of the computer industry, a simple question invariably arises: What dimension to we measure? Shipments? Revenues? Installed base?

Each of these is important in examining the health of the computer industry or measuring the progress of its participants. But there is yet another quantity that can be measured -- user spending. Indeed, since virtually all computer industry measurements are only estimates, a careful cut at user spending is probably the best single indicator of industry progress.

Because of this, the International Data Corporation -- publisher of EDP Industry Report -- has conducted an annual user spending and management attitude survey for each of the last three years. This issue contains results from the study conducted at yearend 1972. Briefly:

- The industry is stable and growing. With U.S. computer spending at $20 billion and increasing steadily at 12% a year, no one development -- in any year or any sector -- can disturb the state of tranquility this industry has attained.

- Teleprocessing has arrived. For the first time, spending on communications-related products and services is significant; it will impact most pockets of user spending and, therefore, most industry sectors.

- Centralization is the trend. Stimulated by or stimulating the movement toward teleprocessing is the desire for more management control over both data processing and total corporate functions.

In support of the above, users are opting for longer term equipment commitments (purchase) and going into telecommunications applications from which there is no turning back. Users are also shifting to outside services where corporate involvement is not possible or desired. As a result of both these trends, the budget allocation to salaries is slowly declining -- from 44.75% in 1971 to an estimated 43.25% in 1974 -- even though spending for personnel rises 10% a year.

EDP Industry Report and Market Review is published twenty-four times each year by the International Data Corporation, 60 Austin Street, Newtonville, Mass. 02160. Entire contents © 1973 by the International Data Corporation. James Peacock, Managing Editor; Carol Chapman, Jack Colantino, Nancy Scull, Associate Editors; C. Oakley Mertz, Research Analyst; Arthur Whelan, Circulation Manager. Patrick J. McGovern, President, International Data Corporation; William Leitch, Vice President/Subscription Services; Walter Misdom, Vice President/Industry Analysis. Editorial ideas and information are collected from numerous industry experts, and are researched and formulated by members of the editorial staff. The information and opinions contained in each issue are based on the best information available, but their accuracy and completeness cannot be guaranteed. Subscriptions: One Year, $95. Single copies, priced as indicated on inside pages, airmailed same day requested. Prices for multiple copies available on request. Telephone (617) 969-4020. Reproduction without written permission is completely forbidden.

The teleprocessing "trigger"

Beneath the surface tranquility of the domestic computer industry, however, there is much churning. And most of it is directly stimulated by a definite and substantial shift to teleprocessing applications. For years, of course, the hope of this approach has been talked about -- almost dreamed of. Now, with the availability of cost-effective products, capable software, and competent communications-oriented personnel, users are finally committing funds to reap the benefits.

What are these benefits . . . and what are management justifications for action in implementing communications-oriented applications? In a phrase, improved information flow. Leading-edge users have been able to gain a competitive jump in operations by installing systems to:

- Enhance customer service through networks that permit the determination of order status, inventory reorder points, financial information, and the like.

- Reduce operating costs by consolidating equipment of greater capacity at central sites and replacing CPUs with terminals at remote sites. Users doing this have both reduced operating expenses and gained better control over data processing operations.

- Spot developing business trends faster, more accurately, as they are occurring. Teleprocessing users get an almost instantaneous picture of new product introductions, competitive influences, etc.

- Minimize the high error rates caused by redundant files, diffused reporting techniques, and varying quality standards.

There's a pricetag on implementing these systems, of course. To take full advantage of teleprocessing benefits, users will spend about 30% more in 1973 to enhance their systems with new or improved mainframes, more communications lines, better terminals and interconnect equipment. On top of that, many users just going into teleprocessing will also opt for entirely new systems -- or complete site modification -- at even higher startup cost.

How users spend their DP dollars

The pie chart across the page shows how U.S. computer users spent their DP dollars during 1972. In summary, some $20.6 billion was spent in support of U.S. data processing activities last year, with $11.5 billion going to external suppliers and $9.1 billion being spent as salaries for EDP and data entry personnel.

The $11.5 billion -- the sum of U.S. user spending -- all shows up somewhere in the revenue statements from companies in the computer industry. In addition, it creates a "multiplier effect" as some industry participants purchase products and services from each other, via OEM or leasing arrangements. Thus, if the inside spending were added up accurately, the revenues to companies in a particular sector would, in most cases, be somewhat greater than the amount shown in this issue as user spending.

The IDC spending estimates by category are shown on page 6 along with similar numbers for 1971 and projections for 1973 and 1974. These estimates are for actual spending patterns by all end users of computer industry products and ser-

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DISTRIBUTION OF TOTAL EDP BUDGET IN UNITED STATES--1972
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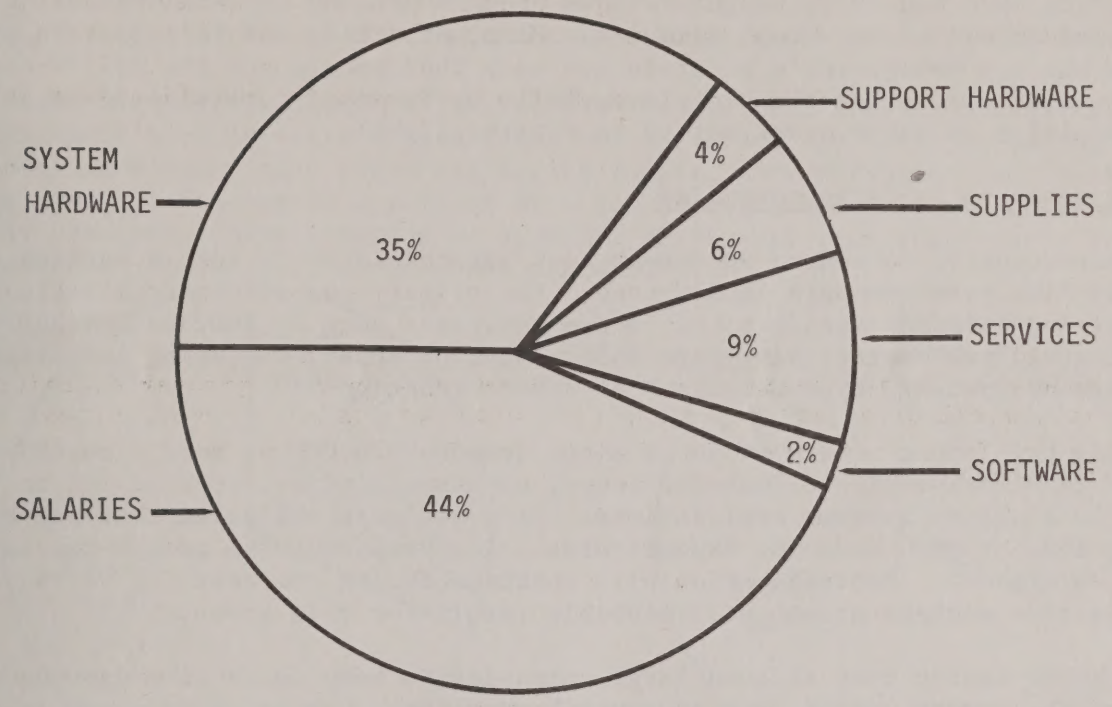

TOTAL=$20.6 Billion

vices. As such, they include some expenditures that are not directly connected with the general-purpose computer budget of most companies.

Minicomputers, for example, often are not purchased out of DP budgets, but are included because most organizations using minis also use general-purpose computers. Likewise, spending for computer services is also included, because once again the user organization also has computers. As a result of this, the services spending numbers also include amounts spent by non-users, usually in lieu of owning a computer. Thus, the figures give a single picture of user spending for computers or their equivalent.

Scattered areas of growth

One of the ways IDC looks at spending, to detect trends, is to analyze users by company size. Among the three broad categories of organizations considered, there are many different patterns and varying rates of growth . . . even companies with decreases in spending for computers.

Naturally, the group of companies most closely watched are the biggest ones -- the major industrials, banks, insurance companies, utilities, merchants, and the like singled out as the Fortune Top 750 lists. Accounting for about 35% of the U.S. installed base of computers, these companies had the slowest growth in EDP spending during 1972 -- only 0% to 5% above the previous year when considered as a group.

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Individual organizations follow widely different growth paths, to be sure, but the general slowdown is based on historical patterns. As originators of data processing use in the mid-1960s, these companies have built up five to ten years experience. Most went into the recession very knowledgeable, but had let costs mushroom to 2%-to-4% of corporate sales, approaching twice what is considered adequate.

During 1970 and 1971, budget reviews brought pruning of data processing expenditures in all areas except salaries. Here, attrition was left to take its course, but top management's attitude has been that people are the all important element in DP . . . that the experience built up in data processing organizations was (and is) a valuable asset not to be treated lightly.

Holding measures by large companies

Consequently, to reduce equipment cost yet retain DP talent, a variety of hold-the-line measures were implemented. The primary one was centralization, taking outlying data processing sites (where equipment such as 360/30s and 360/40s predominated) and centralizing onto 155s, 158s, or 165s . . . using intelligent terminals or System/3-type computers at remote locations.

This has led to growth at large sites (paying $75,000 or more a month) in the 15% to 20% expenditure increase range, with small sites, growing 10% to 15% and reflecting new systems applications. It's medium-sized sites that are holding the line or even reducing expenditures . . . keeping total growth for large companies minimal. Centralization will continue during the next few years, and the same type minimal growth will probably result for this group.

Another factor that allowed large companies to keep costs from growing too much was the strong use of "second-source" suppliers such as third-party leasing and independent peripheral companies. Even though these large companies account for only 35% of the installed base, over 60% of the revenues of third-party leasing companies and independent peripheral manufacturers comes from this group. So the extent to which second-source suppliers can penetrate large companies during the next few years will affect how much spending growth comes from this sector.

Growth where centralization isn't possible

At medium-sized organizations, data processing has been a way of life for a shorter period of time, and so much centralization isn't possible. Additionally, these users aren't as visible as the larger accounts to marketing efforts of second-source suppliers. Thus, they haven't been able to effect as many savings. Spending by this group is expected to rise at about 12% a year as new applications continue to be implemented.

Finishing out the picture, the small sites and new data processing users keep pouring money from new sources into the total DP spending picture. Some 10% of industry shipments each year are to first-time small users, and this adds about two percentage points to total industry growth. The proportion of spending from these sources seems to be decreasing over time, but for some years will serve to keep average user spending growth in the 11%-to-12% range.

A continuation of normal growth

As shown on page 6, user spending growth was depressed about one percentage point during 1972 but -- spurred by a better economy and the rapid growth in tele-

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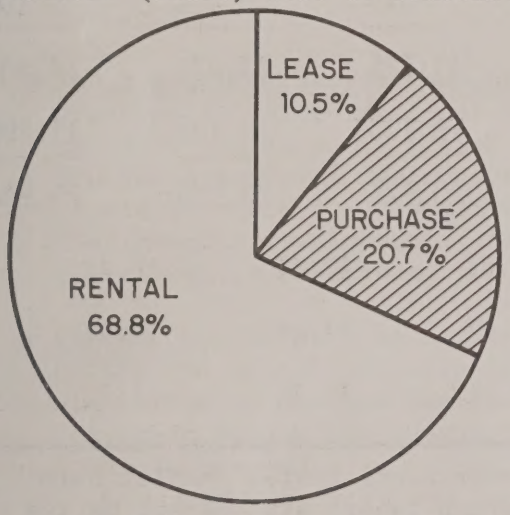
processing applications -- should rebound to the 12% per year level during 1973 and 1974. Expenditures for 1973 should hit $23 billion.

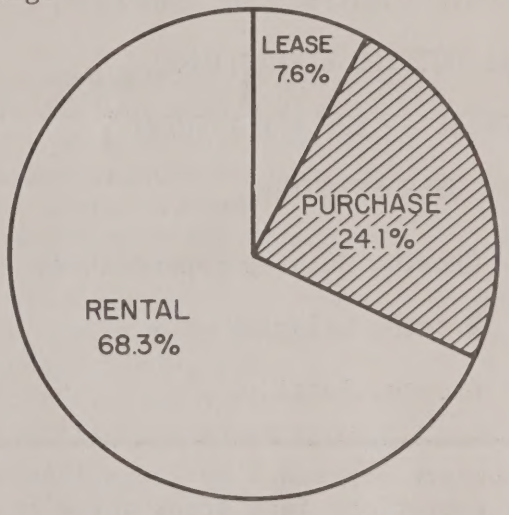
To understand how various parts of user spending will be impacted, here's a brief description of each sector and a condensation of what IDC's interviews indicate users are doing:

System hardware

Management still seems willing to pay for the best equipment available -- to implement more advanced applications and to retain top data processing talent. Although it appears that users are making longer, more definite commitments for their systems, rentals as a percent of total hardware expenditures will remain fairly constant. Also, there's an apparent shift away from third-party leasing to purchase (below) that is somewhat misleading.



1971 TOTAL: $6335 MILLION



1974 TOTAL: $8940 MILLION

As System/370 moves further along in its marketing life -- and the "last generation" of systems approaches -- the third-party alternative becomes less readily available. Users who do not wish to rent will be forced to choose between purchase and whatever long-term plans are made available by mainframers. Indeed, IBM has offered users this alternative with its four-year lease on CPUs (EDP/IR Mar.7,1973) and results from our survey on initial acceptance will be reported in the next issue.

Teleprocessing's influence on system hardware will take the form of more sophisticated communications-oriented mainframes and smaller terminal systems such as System/3. Users will continue to improve the teleprocessing capabilities of existing sites (with Virtual Storage 370s and the like) in efforts to reduce costs through centralized network processing. They'll also make use of disk drives such as the 3330 for storage of on-line data bases, minicomputers as front ends or part of smart terminals, and perhaps even leased teleprocessing systems . . . if third parties are inventive.

Support hardware

Growing slightly faster than the sector's 10% to 12% norm, 60% of 1972's support hardware expentidures (data entry, interconnect devices, and electronic accounting machines) went for data entry. Reason? The catalyst appears to be

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COMPUTER USER SPENDING BY EDP ACTIVITY ($M)
Estimated and Forecast -- 1970 Through 1974

	1971	1972	1973	1974
System Hardware	6,335	7,155	8,040	8,940
Support Hardware	725	795	890	995
Supplies	1,075	1,180	1,300	1,420
Services (Including Education)	1,660	1,985	2,355	2,770
Software (Contract and Packaged)	445	410	485	560
TOTAL OUTSIDE EXPENDITURES	10,240	11,525	13,070	14,685
SALARIES -- EDP + KEY ENTRY	8,300	9,100	10,100	11,200
TOTAL USER SPENDING	18,540	20,625	23,170	25,885
Growth, Outside Expenditures		12.6%	13.4%	12.4%
Growth, Salaries		9.6%	11.0%	10.9%
Growth, Total		11.3%	12.3%	11.7%

the concern expressed by large installations over space costs. Moving data entry operations into areas where space (and often labor) are cheaper is the answer, and such alternatives are increasing in popularity as 3740-type diskettes, devices, stand-alone shared processor systems (with tape output), and remote batch terminals permit data to be prepared at outlying sites, then transmitted to general dp locations for processing and distribution.

Overall, however, with support hardware accounting for only 4% of user expenditures, it's of concern to management only when labor can be saved by spending more for sophisticated data entry devices. Interconnection equipment will continue to coattail increasing terminal usage and the growth of teleprocessing networks, while EAM equipment will do just the opposite, sliding 15% to 20% per year because of increased remote batch and smart terminal use.

Supplies

Like other segments, supplies will also be greatly impacted by the proliferation of teleprocessing applications. With 3330 disk packs, 3740 diskettes and remote terminal cassettes leading the race, supplies spending will continue upward. Another trend, exception reporting and data base inquiry via CRTs, will have a negative impact on paper pollution, but not for a while.

Outside services

Close examination of specific elements of outside services spending -- including that by non-computer users -- indicates that this sector is perhaps the

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fastest growing item in user spending patterns, with remote services and software packages pacing the 20% growth rate. Among the trends:

- Up 30% in 1972, packaged software is continuing to thrive as it appeals to users dissatisfied with in-house delays and expenses, even though additional user modifications may be required to meet specific requirements. System/3 users and 360 utilities enhancements have also helped spur this segment.

- Conversely, custom software spending continues to lag and it appears unlikely to return to previous levels. Reason? Increased user expertise and more realistic in-house development schedules. Users are still reluctant to let contracts to outsiders for programs they feel confident can be completed just as expertly in-house at less cost or purchased cheaply in packaged form.

- Batch and interactive computer services should show by far the greatest spending increases in 1973, having achieved higher spending levels in 1972 than any other components of this sector. The hot areas will again be teleprocessing-related -- rair and remote data entry -- appealing to those users in need of on-line program development, proprietary processing and other complete problem solutions.

- Education will pick up slightly as a result of both increased hiring and greater availability of overhead funds, while installation of new systems and the complexities of network development should add incentive to keep sufficient education funds in the budget.

Add to these another trend that appears to be forming: "user militance". If software required by users is not readily available from mainframers, for example, users appear more willing than ever to develop it themselves. And this is especially true in teleprocessing applications, where complex network development requires not only sophisticated programming expertise, but equally expert systems design capability as well.

Salaries

Salaries themselves have suffered a permanent blow. The recession has caused many highly paid people to accept jobs for lower salaries and the industry is not likely to return to the inflated salary levels of previous years. Nor will companies hire people back in droves, having discovered that proper planning and reporting systems permit them to accomplish more with fewer people.

Even in the salary area, though, the continuing interest in teleprocessing is having an effect, with users trying to retain sophisticated hardware and software expertise to integrate communications systems. Since IBM cannot be relied on for total teleprocessing needs, user expertise is needed to ensure that "patchwork" systems, comprised of IBM mainframes and differing vendors' front-ends, interconnect devices and terminals, will work when pieced together.

It's interesting to note, however, that despite management's commitments to maintaining top data processing talent, spending on salaries, expressed as

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a percent of total user spending, continues to decline at about 1% per year. Simply stated, management appears to be heeding IBM's advice to invest more in equipment, improve overall operations efficiency, and save on personnel costs. So even though salaries will remain the largest single expenditure item, subtle shifts will continue, with more emphasis placed on equipment . . . less on people.

+ + +

Report from court

TELEX INTRODUCES IBM DOCUMENTS; IBM ARGUES MARKETS, CHALLENGES WITNESSES

As Telex presented its case against IBM in the antitrust action that began April 16, the strategy of both parties became clear:

- Telex is trying to hang IBM with its own words. During the first two weeks of the Tulsa trial, Telex has introduced over 650 exhibits, most of which are believed to be made up of internal IBM documents heretofore kept secret. The judge -- A. Sherman Christiansen from Utah -- says he wants the information introduced, especially since there is no jury. IBM later will be allowed to move for striking any or all of the documents that it claims are privileged or contain trade secrets.

- IBM cross examination of witnesses has been aimed mainly at impeaching or imparing their credibility rather than attacking the substance of their testimony. In addition, IBM seems to be resting its case on legal grounds, claiming that the markets outlined by Telex are really not separate markets at all but simply part of the larger systems market. For example, IBM says that if one defines the market the way Telex does, then even Telex is a monopoly. If the courts accept this argument, IBM contends, then of course IBM had 100% of the market the day it shipped its first peripherals for System/360, since Telex is trying to confine the market to IBM compatible peripherals only.

A good example: One Telex witness -- a former IBM market researcher -- testified that he was a member of the secret IBM "peripheral task group" assembled in 1970 to figure out how to combat the growing independent threat. One thing decided, he said, was to add "mid-life kickers" for products. This involved IBM's withholding certain features of a product when they were announced, waiting until the independents had started copying the device before announcing the features as enhancements. So how did IBM cross examine this witness? It forced him to admit that he had been downgraded and had salary reduced just before he left IBM . . . that he felt mistreated by the computer giant. A definite bad mark with the crowd, but not very effective on the judge, since direct testimony wasn't challenged.

Observers on the scene in Tulsa report that if Telex can prove there is in fact an independent peripheral submarket -- or a tape submarket, a disk submarket, etc. -- it will have a good chance of winning on this claim. The IBM documents introduced outline the extent of control in these areas. But during the first two weeks of testimony, not much was accomplished; it appears that Telex has quite a ways to go to prove this contention.

There's another way, of course, that the entire industry might be the winner in the present suit, no matter what happens. The IBM documents entered into evidence and released in testimony will give a good view of IBM plans and strategy for the future. These are being collected and studied, and EDP/IR soon plans to present information from them.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" MAY 11,1973 • VOL.8,NO.14 P.J.McGOVERN,EDITOR

Underwhelming response

HINTS OF INDEPENDENCE AND BACKLASH ARE EVIDENT FROM SURVEY INDICATING LOW USER ACCEPTANCE OF IBM'S FOUR-YEAR PLAN

When IBM announced its four-year term lease (4YTL) for virtual storage central processors (EDP/IR Mar.8,1973), the general expectation was that users, as in the past, would rush to sign up. This didn't happen. Indeed, the bulk of today's users seem to have told IBM they aren't going to commit themselves for four years -- and they are willing to give up what they calculate would be a 13% monthly saving to retain their flexibility.

About one month after the 4YTL announcement, EDP Industry Report sent a mail questionnaire to almost 2,000 IBM users of various types. Of those with rented VS/370s -- the ones that could immediately take advantage of the plan -- there was what most positively might be described as underwhelming acceptance:

Do you use any system enough to consider the plan? 76%-*Yes;* 24%-*No*
Did you sign up for the new plan on your rented VS/370? 6%-*Yes;* 94%-*No*
What role did/will the plan's inflexibilities (e.g. lock-in, extension and termination constraints, etc.) have in your decision?
64%-*Heavy* 20%-*Moderate* 6%-*Minor* 10%-*No Role*

The reasons go beyond the plan's inflexibility, however. In analyzing returns from the survey, EDP/IR detects more clearly than ever distinct signs of user sophistication . . . a cutting at long last of the umbilical cord:

- A user backlash -- begun almost four years ago with unbundling and nurtured by the austere environment of the recession -- has developed. Users are more confident of their ability to do it themselves; they more clearly see through IBM's moves.

- As a result, today's user seems to have rejected IBM's latest edict. He still likes the hardware, but is more independent when it comes to accepting what's best for IBM's balance sheet.

- Specifically, users think they can do better than the four-year deal IBM is offering. And the four-year plan may have backfired for IBM, since its promise of long life for VS/370 seems to be promoting more interest in purchase and third-party lease.

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ANALYSIS OF CURRENT EQUIPMENT ACQUISITION PLANS
By Number of Systems On Order for Rental at Time of 4YTL Announcement
(Copyright 1973 -- International Data Corporation)

VS/370	Rent	3rd-Party Lease	Purchase	4-Yr. Term	Total
125	5	0	0	0	5
135	11	0	0	0	11
145	7	3	2	1	13
158	12	8	1	7	28
168	3	4	0	1	8
TOTAL	38	15	3	9	65

For every user who had ordered a 370 for rental and who now plans to take IBM up on its four-year plan, almost two have opted for an acquisition method -- purchase or third-party lease -- that defeats IBM's apparent attempt to insure monthly payments for an extended period (table, above).

Some of this user attitude change, of course, is simply based on the passage of time; many users change their minds -- or actually make them up -- as the time for delivery approaches. Indeed, of the 26 users who said they originally planned a third-party lease, two have shifted to 4YTL and two have decided to purchase. And of 25 originally planning to purchase, five now plan a third-party lease and four plan to use the 4YTL.

All but one of these shifts to 4YTL -- just as the bulk of the rental order shifts shown in the table -- are 158s. And some observers believe IBM intended the plan for its larger machines . . . that the announcement included smaller models (115 -- 145) for consistency and that, therefore, the 6% of these who signed up are "gravy." But even if this is so, the net effect of the 4YTL announcement is negative: In EDP/IR's survey, 22% of the 158s and 168s on order moved away from monthly payments to IBM while 10% that had planned to buy outright from IBM (direct or via third-party) have accepted the 4YTL.

Of course, as 158 and 168 deliveries begin, there could be a delayed acceptance of the 4YTL. But user attitudes from the survey don't indicate this will happen. So unless the plan is a backward attempt to encourage purchase -- or is being set up as a giveaway in an eventual antitrust settlement -- 4YTL must be termed less than successful. EDP/IR thinks IBM finally goofed in reading the user marketplace!

Some variation by model

It seems fairly clear that IBM, in introducing the four-year plan, didn't expect it to appeal to all users. The termination and upgrade clauses penalize those users whose equipment requirements have not "stabilized" -- who are likely to add memory or upgrade to a larger CPU during the next four years. So the appeal is primarily to those users who have definitive equipment needs and who desire longer term commitments at lower costs.

These goals can be met by purchase, by third-party lease, or through the "package" plans -- spearheaded by Itel -- that include an IBM central processor

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with memory and peripherals from an independent. But there are users who still desire the security of being under IBM's wing and who believe this security is worth the 15%-to-30% savings that might be realized from a third party. As one user puts it: "The plan is not the best for savings, but it is the safest."

Other comments such as this -- discussed later in this issue -- indicate that there is still user hesitancy to break completely with IBM; there's simply much less readiness than was expected to commit for four years. The model-by-model discussion, below, indicates some of the variations.

115/125: Only three 115s and eight 125s (all, naturally, on order) were represented in the survey responses, so we have only a flavor for what the small 370 user may do. The majority still intend to rent their systems, but a significant portion are considering either the 4YTL or a third party. Much of the confusion among these smaller users may stem from the fact that they intend to use DOS/VS, but don't yet know what this entails.

135/145: There is no immediate rush among 135 or 145 users to sign up for the 4YTL plan, and this may again illustrate the smaller user's need for flexibility and lack of equipment definition two or four years out. Despite the fact that most 135 and 145 users clock well over 176 hours a month on their systems -- and thus would be likely candidates for the plan -- only 6% of the 135s and 8% of the 145s using overtime are interested in 4YTL. Termination charges (due to future upgrades of the CPU) and upgrade charges (more memory or features) appear to play a greater role in the plan's evaluation and ultimate rejection by most of the 135 and 145 users.

Shifts in financing methods, however, are more noticeable among 145 users. Even though only one user has signed up for 4YTL, almost half of the users surveyed intend to switch from rental to another financing method. By contrast, 135 users seem content to remain with their original acquisition intentions, primarily rental.

155/165: Although the 4YTL does not apply to the 155 or 165, it is interesting to note that the majority of each indicated that if the plan were available for these models, they would consider it. In fact, most of the 155 and 165 users responding had 158s or 168s on order, and their intentions are verified by the response from these large VS/370 users.

158/168: IBM's four-year lease plan had by far its biggest impact on 158s and 168s on order, with the 158 leading in converts to 4YTL. Here, as with the 145, users are even less consistent in their plans about equipment acquisition. Of those 158s switching from one acquisition method to another (about 50%), more than a third are going third party and an equal number 4YTL. This confirms the trend, especially among large-scale 370 users, toward longer equipment commitments and reflects greater confidence in the 370's ability to provide processing power for several years.

As for the 168, a similar pattern was evident: Third-party leasing has become very attractive, outpulling 4YTL as a long-term alternative to renting. In fact, many of the more than 75% of the 168s considering a switch are going from purchase to third-party lease, apparently to maintain more flexibility.

360. In the survey, EDP/IR also talked to a representative cross-section of System/360 users to see what effect, if any, the 4YTL might have in encourag-

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VIRTUAL STORAGE INTENTIONS
370s Installed and On Order (No. of Systems)

370 MODEL	DOS/VS	OS/VS1	OS/VS2	VM/370	SUB-TOTAL	OTHER YES*	NO	TOTAL
115	1	0	0	0	1	2	0	3
125	6	0	1	0	7	1	0	8
135	40	6	0	0	46	35	7	88
145	22	34	11	3	70	41	1	112
155+	0	8	19	0	27	30	7	64
158	1	10	21	0	32	30	5	67
165+	0	2	3	0	5	15	0	20
168	0	3	11	0	14	14	1	29
TOTAL	70	63	66	3	202	168	21	391

* Intention to use VS indicated, but no specific Operating System chosen
\+ With DAT box

ing their move to System/370. It had very little. In fact, it seems to have reinforced the commitment of some users to 360, a phenomenon illustrated by the resurgence of interest in larger 360s from third-party leasing companies.

Generally, a "hard core" of 360 users seems to be developing . . . a group willing to try riskier alternatives (independent peripherals, "home grown" software, and the like). Today's 360 user without a 370 on order is content to enhance his present system; he doesn't feel that 370 offers enough of a performance improvement over 360 to justify an upgrade. A typical comment: "We continue to rent our 360 because it works." Most users remaining with 360, of course, own their equipment or have long-term third-party arrangements.

Indeed, many users of third-party-leased equipment are creating business for their suppliers: Demand for 360/50s and 360/65s often exceeds supply, and rates are holding level or even exceeding those available a year or so ago; in addition, the user leasing 360s and going to 370 usually wants the same sort of financial arrangement for his new equipment.

The users speak . . .

The survey produced a variety of comments -- shedding some light on the economic environment still facing IBM and pinpointing the uncertainties facing 370 users about to embark down the trail of virtual storage. The plan's inflexibilities appear to be the most serious obstacle to its use as a long-term acquisition method; two-thirds of those users with rented 370s indicate that these inflexibilities played a big role in their decision not to go 4YTL.

And users are willing to pay for this flexibility, as the table on the next page indicates. It is a tabulation showing, for 99 sites, the average monthly rental bill on equipment currently installed, and the amount of savings that would be realized if the 4YTL were accepted. These potential savings of over $500,000 per month on a rental bill of almost $4 million total -- a savings of almost 13% -- are significant evidence that the user is willing to pay for flexibility.

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POTENTIAL 4YTL SAVINGS REPORTED BY USERS CHOOSING TO CONTINUE RENTING
(Based on Senior System at Sites, Some of Which Use More Than One Mainframe)

Sr. System	No. of Sites	$K Rental	$K Potential Savings	% Savings
135	33	$ 457	$ 41	9.0%
145	37	1,065	113	10.6
155*	21	1,386	179	12.9
165*	8	1,076	182	16.9
TOTAL	99	$3,984	$515	12.9%

*Most are at sites with VS/370 equipment on order as replacements

Other comments indicated that even though approximately 40% of those 370 sites surveyed are using or intend to use their systems for data communications, the plan had little appeal. And it was here that IBM would have been expected to "score big." Part of the users' failure to sign up is a result of the variety of equipment from different vendors required for most data communications systems, and the inability of IBM to "coordinate leases on multiple IBM equipment."

. . . some "pro"

Among the more "loyal" contingent in IBM's customer base are those users of 360s and 370s who currently lease many of their IBM peripherals under the fixed-term or extended-term plans. Users generally liked these peripheral plans and were for the most part also favorably impressed with the terms of the 4YTL . . . but few signed up.

Additional support for IBM appears to come from those users who have very definitive equipment needs and who desire longer term commitments at lower cost. These users have undoubtedly determined that 370s can meet their immediate and future needs without a CPU upgrade or the addition of large amounts of main memory over the next four years. The users think virtual storage will allow their memory needs to be met via the disk-drive route.

In cases where equipment needs appear to have "stabilized" -- such that termination and upgrade charges will not become prohibitive within the next four or so years -- many large System/370 users seemed more willing to consider the plan.

. . . some "con"

Most negative comments on the 4YTL plan come from 370 users already using a third-party or strongly favoring such use. Among this group, most commented that cost savings were the prime reason for switching to third-party from rent in the first place, and it was also the reason they planned to stay with their decision to go third-party even after the 4YTL was announced. The 370 users remaining with a decision to rent, however, indicated they are doing so because their equipment needs have not "stabilized" or aren't yet clearly defined. So flexibility is still desirable or absolutely necessary, since the new plan is extremely inflexible. Any changes in CPU or memory -- including addition to main memory or an upgrade from one model to another -- require penalty payments, the loss of lease benefits, or a lease extension. To review:

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- Termination requires payment of 12.5% of the total lease (48 times the monthly payment) or 25% of the remaining payment due.

- Upgrades (addition of features or more memory) can be 1) added at the monthly rate of 1.15 times the monthly charge, or 2) included in the lease contract, in which case the term of the lease is extended by a period determined as follows:

$$\frac{\text{New monthly charge} \times 48 - \text{Old monthly charge} \times \text{months used}}{\text{New monthly charge}}$$

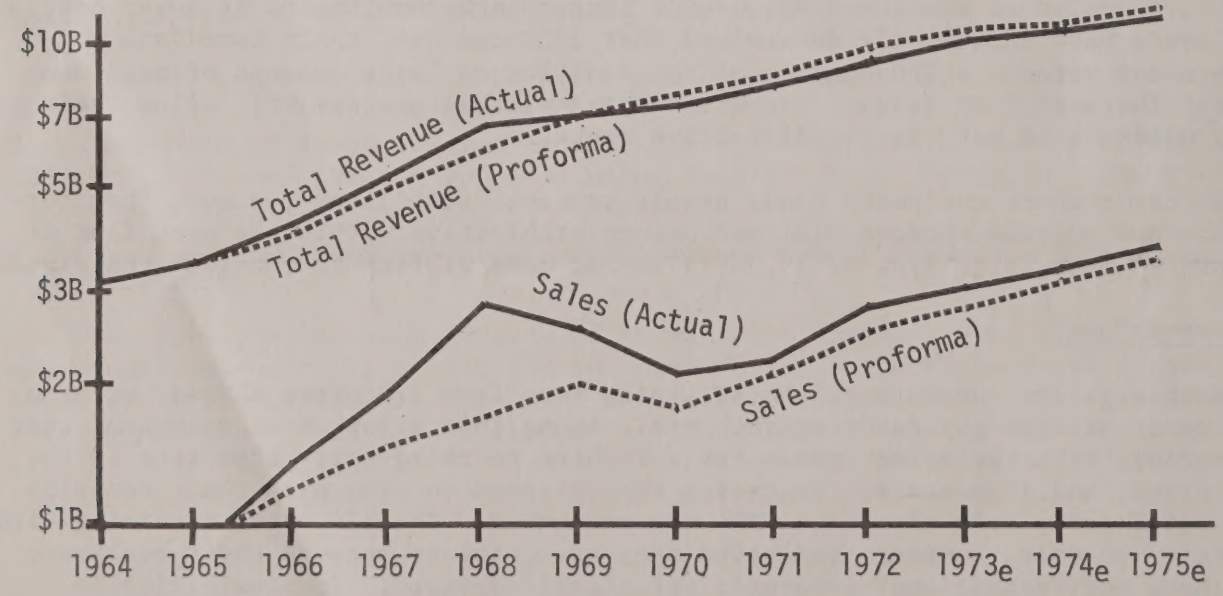
- Termination charges also apply to feature removal or model downgrade (memory reduction) and are calculated as in the first item.

Why did IBM do it?

The overriding influence behind any IBM pricing shift such as 4YTL, it seems to EDP/IR, is revenue stabilization. IBM simply can't afford to have major peaks and valleys in its revenue curve. It had a serious surge of sales activity (see chart, below) during the third-party-leasing boom of the late 1960s. This was followed by the recession, the shift from 360 to 370, and the start of another sales boom . . . this time by users.

So as leasing companies such as Itel began to be successful with their package lease plans . . . deals that result in outright purchase of the CPU, the substitution of independent peripheral equipment for IBM products, and the long-term user commitment to someone other than IBM . . . the combination was too much, or so it seems. And IBM reacted, perhaps too much; the company has been accused of corporate overkill more than once before.

WHAT IF . . . THE LEASING COMPANIES HADN'T EMERGED?



ACTUAL IBM SALES AND TOTAL REVENUES, plotted above (solid line) would have been much "smoother" if third-party leasing companies had not purchased $2.5 billion worth of computer equipment during the last half of the 1960s. The "pro forma" lines, as estimated by IDC, show WHY IBM strongly seeks to prevent sales surges

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In many ways, 4YTL must be looked at as an extension of the same type thinking that led to first the fixed-term lease plan (a reaction to the success of independent peripheral equipment manufacturers) and then the quiet implementation of the extended-term lease plan. It is more of a policy, and has even been applied to the new Mag Card II typewriter from IBM's Office Products Division.

What effect will 4YTL have?

Both from evaluation of the questionnaire returns, and from conversations with some third-party leasing companies, EDP/IR has drawn the conclusion that IBM's 4YTL will definitely have a positive effect on these alternate suppliers of IBM mainframes. But it will not be as severe as the table on page 2 might suggest. From the questionnaire, there is no way of knowing how many users who originally planned to rent, and now plan to go with a third-party, actually made this decision after the four-year term lease was announced. It is a relatively common practice for users to indicate rental when ordering equipment, waiting until delivery time for a final commitment.

On the other hand, the effect can only be positive. Atlanthus, for example, says the net effect will be "good;" Itel takes a more conservative view saying that it is not worried . . . that 4YTL has not hurt yet . . . that it "will affect the marketplace some, but not dramatically."

And EDP/IR thinks we may have another of those rare instances where history in the computer industry can tell us something. When IBM announced "unbundling" there was little direct user reaction, but not too long after the announcement the independent peripheral manufacturers began to become an important factor in the computer industry. More than one observer proposes that the idea of thinking about several types of charges rather than one monthly bill had more than a little to do with the user acceptance of additional suppliers.

In much the same way, IBM's 4YTL may mark the beginning of true user independence in thinking about equipment acquisition methods. The delay in taking IBM up on its offer, if that's all that's going on, would indicate that users are thinking a little harder . . . are beginning to consider computers as part of an overall capital equipment picture. So 4YTL may mark the beginning of the end of the computer industry as a truly rental one.

That has vast overtones. It will improve the ease with which a small company can compete in the computer marketplace . . . will impact overall industry price levels . . . will put more emphasis on price/performance requirements for IBM competitors . . . will even lead to more stability of market share as long-term commitments become more commonplace. EDP/IR will certainly continue to monitor the marketplace, and report any developments.

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Report from court

TELEX RESTS ITS CASE; IBM DEFENSE STRESSES DEFINITIONS

Even though Telex has rested and IBM has begun its defense, it's hard to tell who's ahead in Telex' $1.2 billion antitrust suit. As the battle continues, however, it's apparent that much of the outcome will be based not so much on public courtroom actions as on the homework being done by Judge A. Sherman Christensen in reviewing exhibits and depositions placed in evidence.

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As it had done in the Greyhound trial, IBM routinely moved for dismissal on the grounds that Telex had not proven the facts of its case; but Judge Christensen, not unexpectedly, ruled that IBM would have to present its defense. Thus, for the first time since its antitrust troubles during the 1930s, IBM is publicly presenting its case.

The case is large and complicated, and there is no jury that requires a detailed explanation of every element. Thus, the courtroom presentation is simply a skeleton or framework around which the judge can interpret the immense documentation in the case. It's evident that the success or failure for Telex depends to a large extent on how well the judge does his homework.

IBM is basing its defense on a multiple strategy, all of which seem to say "so what" to the basic evidence that Telex introduced. Among other things:

- User witnesses are being called to show that, in fact, there is much competition in the industry, and that it is increasing.

- To play down the importance of the formerly secret IBM documents introduced by Telex, IBM is calling its executives to state that these documents were prepared by low-level employees and had little or no effect on IBM decision making.

- IBM seems to be relying heavily on the DuPont "Cellophane Case" as legal precedent for dismissal. There, the Supreme Court found DuPont not guilty of monopolizing the cellophane market -- even though it controlled all manufacture of the product -- because cellophane competed with other forms of wrapping (wax paper, Saran wrap, etc.). As applied here, IBM is attempting to show that its systems and peripherals have a great deal of competition from other mainframe manufacturers, timesharing, and so on. Because of this, IBM argues, there is no separate market for independent peripheral equipment -- that it's just part of the larger data processing business.

- In another line of defense, IBM is trying to show that Telex simply is claiming that IBM monopolizes its own product line -- which it argues is not against the law. IBM points out that, if the court were to accept the Telex market definition, then General Motors could be said to be monopolizing the market for motors in its own cars.

Many observers in Tulsa felt that Telex was too quick with its presentation. They forget, however, that most of the evidence was in documents that the judge has been reviewing on a nightly basis. And so it will be, to some extent, with IBM's side as well. The entire case will hinge on what the judge digs out of the documents -- and how he interprets the legal issues.

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The U.S. Court of Appeals for the Second District has reversed the ruling handed down by a subset of its members and found that the 1200 documents IBM had removed from the CDC files before handing them over to the Justice Department must now be produced, after all. IBM says it overlooked the documents in the rush to produce 17 million document pages for CDC in three months. The judge there, subsequently backed up by a panel from the Appeals Court, said IBM had not given up its right to delete privileged documents from the microfilm. Judge Edlestein ruled differently, now has been supported. IBM -- even before the latest decision -- reserved the right to appeal to the Supreme Court, but hasn't done so yet.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" MAY 31,1973 • VOL.8,NO.15 P.J.McGOVERN,EDITOR

Arena for an IBM/AT&T tangle?

TELETYPE'S NEW CRT/PRINTER TERMINAL COMBO COULD PACE GENERAL-PURPOSE MARKET AS LARGE AND SMALL SUPPLIERS SEE NEW BUSINESS FROM INFORMATION APPLIANCES

This country is going to do things with the combination of computers and communications.

Anyone with even a marginal knowledge of technology today could make a statement such as that quoted above. But when the speaker is an executive from AT&T . . . and the occasion is the press introduction for Teletype's new Dataspeed 40 "family" of keyboard/printer/CRT terminals . . . the statement takes on a little more significance. Indeed, it has overtones of both an overture for new marketplace activity . . . and a call to arms.

The marketplace is certainly bristling with activity. Not waiting for a setting such as next week's National Computer Conference, several current or potential important forces in the less-than-dominated computer terminal marketplace followed AT&T's lead in making May de facto "terminal month."

- General Telephone and Electronics (GTE) continued its "unified approach to the data communications market" by unveiling a series of new terminals, remote CPUs, and programmable front ends. Part of the line is a special-purpose Videomaster terminal for stockbrokers.

- Burroughs broadened its on-line banking equipment line by introducing a thrift industry teller terminal system, complete with high-speed processor and a terminal that reads passbooks or magnetic cash/credit cards.

- Addressograph Multigraph jumped into the automated credit terminal business with Amcat, its computer access terminal. And to "prove" that it's serious about information appliances, AM announced several major customers -- including American Express -- for Amcat.

- Most of the major point-of-sale equipment manufacturers -- Bunker Ramo, Litton, NCR, and Pitney Bowes-Alpex -- plus National Semiconductor, a new entrant, reacted quickly to the Universal Product Code selected by the grocers and introduced products for that marketplace.

- Other terminal manufacturers -- preparing for NCC or simply taking advantage of the general atmosphere -- are touting beefed-up products.

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Notable by its absence in this latest round of product announcements is IBM, still the leading supplier of computer terminals in the United States. At year-end 1972, the International Data Corporation's count of all terminals used with computers in this country was as follows:

U.S. TERMINAL MARKET, BY NUMBER OF UNITS, YEAREND 1972
(Copyright, 1973 -- International Data Corporation)

Manufacturer	1972 Shipments	Installed Base (YE 1972)
IBM	26,900	150,000
Teletype	16,800	80,000
Other Mainframe	14,200	31,000
Independents	29,700	132,000
TOTAL	87,600	393,000

IBM, of course, is very much "into" terminals, as the table above indicates. Its 30% of 1972 shipments didn't keep pace with its 38% of the installed base, but that should change this year as volume deliveries of the 3270 (CRT/keyboard terminal replacement for the 2260) and the 3735 ("semi-smart" remote printing terminal) begin. So with AT&T admitting quietly that IBM is the major competition, and its talking openly about shipment levels growing to the 15,000-to-20,000 unit level by yearend 1974, the nature of the volume general-purpose marketplace activity seems quite obvious.

Terminal trends

The points covered above -- a potential numbers game race between IBM and AT&T plus the serious start of what may be a vast special-purpose terminal, or information appliance market -- illustrate what IDC studies show and the statement by the AT&T executive implies. Terminals of all sorts -- intelligent, editing, batch, conversational, application unique . . . any device that can transmit and receive data to and from a CPU via any type of communications link -- are going to grow dramatically in numbers during the 1970s and beyond. Among some of the more specific trends:

- General-purpose terminals connected to general-purpose CPUs (chart, page 3) are growing at about 25% a year and will triple in number -- to almost 1 million -- by 1977. During this same five-year time period, the number of CPUs will only double.

- Application-unique terminal devices will bring the computer closer and closer to the consumer. These information appliances are destined to achieve the most spectacular growth within the terminal sector; no saturation point is in sight as new applications continue to come to the forefront.

- A potential battle is shaping up between IBM and AT&T -- at least in the general-purpose terminal sector. But amid the intense competition and the large number of terminal manufacturers, much maneuvering for position remains to be done, even in general-purpose terminals.

- In the application oriented area, it's difficult to determine whether a handful of leaders will emerge . . . or whether fragmentation by application will continue, with no overall leaders.

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- The greatest predictable growth rates will be among processor terminals such as the IBM 3735, the Sycor 340, and the Datapoint 2200.

- IBM -- with less than half the general-purpose market and currently paying only token attention to the special-purpose portion -- stands to be most impacted by the increased use of terminals. Despite IBM efforts, views are changing as to the amount of centralized CPU processing power really needed for efficient system utilization.

- There seems to be room for everyone. With $8 billion to $10 billion worth of equipment expected to be shipped between now and 1977, a real sellers market seems to exist. Even AT&T has expressed concern about meeting demand for its Dataspeed product line.

Amidst all the glowing prospects -- especially for the independents -- for burgeoning terminal equipment growth, there is confusion, some of which has been building for at least two years (EDP/IR June 30,1971). How do you define, or even categorize terminals? It may be important only to purists . . . and it appears to be a "problem" that is being solved over time. But EDP Industry Report thinks much is to be gained in thinking through the definition "dilemma" . . . especially at a time when AT&T (see page 7) has introduced a single product that straddles the once-clean split of terminals into printers and CRTs. Here we go:

What kinds of terminals are there?

After considering the various types of terminals already in use plus those announced and scheduled for delivery during the next year or so, EDP/IR finds that a breakdown by end user thrust (examining the flow of data in and out) is perhaps the most meaningful, even though subcategories exist within each type:

- Operator-oriented terminals consist of a keyboard for input and either a printer or a CRT for output. These condense the traditional two-step data entry function into a direct, one-step process, but there are at least subsets: conversational terminals (such as Teletype 35s and IBM 2741s); editing terminals (such as the IBM 3270) with extensive error correction and block transmission facilities; and processing terminals (such as IBM's 3735 and the Burroughs TC 500) which are programmable and provide processing power as well as editing capabilities.

- Machine-oriented terminals normally transmit input from machine (CPU) to machine, and receive output in the same manner. The important distinction here is that the operator communicates only indirectly with the host CPU. This class consists of batch terminals (primarily card oriented like the IBM 2780) where the bulk of data is entered and transmitted in batch mode; remote CPUs (such as an IBM System/3,Mod.6) commonly found in data communications networks; and "other" remote devices (such as OCR readers or tape transports) that can transmit data to a CPU when equipped with proper communications.

- Application-unique devices provide input and/or output in such a way as to make the device useful for one or a limited number of specific applications. The entire product is geared only to that application, it is priced in relation to the costs of the application, and often (for the present, at least) it looks more like the manual equipment it replaces than a piece of computer gear. Among the more prevalent

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applications so far are stock quotation consoles, bank teller terminals, credit verification systems, and point-of-sale terminals . . . information appliances.

The markets

As new applications arise, or new products come along, the above categories will likely need change or supplementation. Indeed, today's so-called intelligent terminals actually fall into all three -- and they may well be used for many application-unique applications by the use of special programming and/or customized keyboards. But for today, at least, growth trends for the terminal marketplace can best be tracked on this basis. Here are IDC's numbers:

U.S. TERMINAL MARKET, BY NUMBER OF UNITS, EXPECTED GROWTH 1972-1977
(Copyright, 1973 -- International Data Corporation)

Type	Installed YE 1972	% Growth	Installed YE 1977
Operator Oriented	280,500	27%	906,000
Machine Oriented	22,500	19%	54,500
Application Unique	90,000	N/E	400,000++
TOTAL	393,000	30%+	± 1.5 million

Operator-oriented terminals, for example, constitute the largest group today, and will continue to grow at a faster pace than machine-oriented terminals. This is largely due to the relatively diminishing use of punched card equipment. But two-thirds of today's operator-oriented terminals are conversational, and this subcategory will grow at only 22% a year. Processing terminals of the operator-oriented variety -- IDC's subcategory of products that most closely fits the label of "intelligent terminal" as thrown around the industry -- will see spectacular growth: from the 16,000 level at yearend 1972 to over 150,000 by 1977.

In the machine-oriented sector, batch terminals and remote CPUs will grow at about 17% by number, significantly more in value because of their high price. Here again, the smallest subsector -- "other" devices -- will show the fastest growth. Equipment already at remote sites will be tied to CPUs via communications interfaces; in addition, new products and lower priced versions of existing ones will produce good growth. But fewer than 10,000 units is involved.

It is among the application-unique devices, however, that the terminal market will achieve its most dramatic growth over the next five years. Growth rates are meaningless, because many subcategories of products shipped in the late 1970s don't even exist today. Indeed, IDC has begun its detailed study of this market by starting up a new publication, AUTOTRANSACTION Industry Report.

The market for application-unique devices is solely dependent on the number of marketable ideas that catch on, and therefore almost limitless. Some of today's applications, for example, have been implemented with general-purpose terminals, while others involve new versions of existing products (such as cash registers). In almost all cases, IDC expects to see newer, more complex generations of equipment that are simpler for the user -- eventually the consumer -- to understand and use.

One single category of these information appliances -- the point-of-sale terminal for general merchandise -- has grown from the $2 million shipment level

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DISTRIBUTION OF GENERAL-PURPOSE TERMINALS BY HOST CPU -- 1972 and 1977
(Copyright, 1973 -- International Data Corporation)

Price Class ($ per month)	CPUs Installed 1972	CPUs Installed 1977	CPUs with Terminals 1972	CPUs with Terminals 1977	No. Terminals Per CPU "with" 1972	No. Terminals Per CPU "with" 1977	Total No. Terminals 1972	Total No. Terminals 1977
Small (Under $2500)	18,600	47,000	11%	16%	4	8	7,700	56,000
Medium (to $10,000)	22,100	38,000	16%	26%	9	15	31,100	148,000
Large (to $40,000)	14,650	14,000	48%	77%	23	37	165,400	402,500
Very Large ($40,000+)	2,650	4,000	83%	93%	40	85	87,800	313,500
TOTAL	58,000	103,000	26%	31%	20	29	292,000	920,000

in 1970 to an expected $70 million this year. And that doesn't include the same type product for supermarkets . . . or a similar device for fast food operations. But it proves the speed with which ideas become markets. The ultimate success of this subsector, then, remains to the imagination of vendors.

Why the growth?

Although the growth rate for terminals will vary depending on type, industry, and user needs, three factors appear to be providing the accelerator effect that puts terminals into the fastest growing portion of the computer industry:

- As the chart above shows, the number of general-purpose CPUs will double over the next five years to the 100,000 level. Significant increases will occur in the very small category (and the chart does not include minicomputers). The portion of general-purpose CPUs that support terminals will grow in every category.

- The average number of general-purpose (operator and machine oriented) terminals connected to each CPU that has terminals will also grow -- from 20 to 29 -- doubling in the smallest and largest categories.

- In addition, large, existing networks will begin adding terminals to small remote CPUs as management inquiry applications increase. Smaller companies will begin to follow the lead of larger trend-setting organizations and start to establish networks of their own, based first on small CPUs.

The result of all this will cause a seven to ten-fold increase in the number of general-purpose terminals attached to System/3s and 360/20s -- or their equivalents five years hence -- compared to a mere tripling for general-purpose terminals overall. Also, substantial growth will occur among large CPUs, where approximately one-third of all general-purpose terminals already exist. Thus, it appears that users will take fuller advantage of already-established patterns for centralization of CPU power. This will undoubtedly affect equipment acquisition patterns, especially when application-unique terminals are also considered.

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Practical applications . . .

Gone are the misconceptions of total management information or inquiry systems . . . the ease of terminal access. Instead, users appear to have re-evaluated terminal needs in terms of solving the most common everyday problems. Of the most general functions performed by general-purpose terminals -- message switching, data entry, inquiry, interactive problem solving, and monitor/control -- data entry and inquiry have the greatest growth potential.

Reasons? Most data entry applications are already implemented in some manner; and since a terminal implies a cost-effective change in technique, it's usually not so difficult to justify as other applications. As the use of terminals for data entry increases, so does the tendency toward specialization . . . and the significant potential for upgrading. Inquiry applications, although almost limitless, tend to require more careful justification. But because their implementation is still limited compared to potential, they will continue to grow.

Other applications will not fare so well. Message switching has passed its prime, already close to saturation. Interactive problem solving and monitor/control applications are too sophisticated for mass use, thus have lower potential.

Other factors will also influence terminal growth in any particular industry. Different types of business activity involve greater emphasis on some applications than others, so the sum of these requirements determines the absolute potential terminal use for any given industry. Industry structure, for example, has much to do with terminal acceptance, and industries dominated by large corporations are more likely to offer higher levels of computer network use, and thus terminal potential. Similarly, corporate structure and the degree of centralization will influence how many terminals a particular organization opts for. Competition plus the need to improve efficiency and/or customer service influences how fast individual companies within an industry follow the leaders down the terminal path.

What about competition?

In no other portion of the computer industry does the competitive picture appear so exciting, yet so confused as in the terminal arena. At last count, there were over 100 terminal manufacturers of one sort or another -- with more entering every month -- each with some new twist, or lower prices, or greater capability. Much of this competitiveness is based on the fact that terminals, at the end of a communications line by definition, have a certain amount of built-in compatibility. Thus, IBM doesn't dominate the sector. Indeed, there is no single controlling force present in the overall terminal marketplace -- though AT&T, through its products and its line offerings, tends to set certain standards. And no such dominating force is likely to develop. Witness:

- IBM's overall market share is less than 40% and only in the machine-oriented terminal class does it have a share significantly greater than 50%. It doesn't even offer products in every class, but in those where it does, it holds a significant share.

- Among the other mainframers, only Burroughs and Univac have given terminals a marketing effort separate from their computers; in no case, however, have they been successful enough to shape markets.

- Although most of the major communications companies -- AT&T, ITT,

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GTE, even UCC -- participate in the market, only Teletype has made any impact . . . now being continued with the Dataspeed 40.

- The independents are numerous, but none is large enough to make any serious impact. Several of them, however, have roughly equal shares of the CRT processing and non-compatible CRT editing sectors.

And this fragmentation is likely to increase as terminals become more and more specialized. Despite the significant migration within IBM's terminal product line, and the growth within the subsectors in which IBM participates, IBM's market share will remain relatively stable through 1977 -- just under half the general-purpose terminal market, by number. With no dramatic changes in IBM policy, in fact, long-term forces are likely to cause a decrease in IBM's influence over the total terminal market.

For one thing, competitive increases in the amount of processing capability incorporated in terminals -- and the resultant decreased need for high-powered CPUs -- meets head-on with IBM's apparent business approach. IBM's whole marketing emphasis in the terminal sector to date has been as an extension of the peripherals market, not toward terminals as standalone partial processors.

In addition, the growth of application-unique terminals will put IBM in the midst of a dilemma: On the one hand, these products will nibble into existing business to some extent; on the other, they often represent "mini" market segments that IBM traditionally has chosen to overlook.

Finally, users themselves have already exhibited greater independence in the selection of terminal equipment than in areas more closely associated with the CPU. This unbundling-oriented backlash is probably the most real that IBM faces.

Other mainframers have been successful by concentrating on niches in the terminal marketplace: Univac with its DCT series of batch terminals, Burroughs with its TC-500 and related products; NCR with teller terminals and POS systems. The independents, on the other hand, have adopted various approaches -- some concentrating on becoming total terminal suppliers; others focusing on one of the three terminal subsectors and building a hierarchical product line; still others selecting specific pockets that complement the mainstream of their other businesses. Many of the independent terminal manufacturers, remember, got into business via the tremendous potential that existed for Teletype replacements and the need for faster data transmission and/or better editing features. But now . . .

AT&T levels both barrels

At a communications conference in Boston earlier this month, Teletype along with its grandparent AT&T held the first public showing of the Dataspeed 40 family of terminals. Included in the announcement were various combinations of a keyboard, a 2000-character CRT with 6000 characters of memory and "no reason" for not adding more memory at $15 a month, and a chain-type printer that operates at 220 or 314 lines a minute, depending on the character set. "Recommended" monthly rates are: Keyboard display, $110 to $125; receive-only printer, $105 to $120; keyboard display with printer, $175 to $195. OEM prices being talked about are in the 20-to-30 times monthly rental range.

So everyone -- users, independent terminal manufacturers, and mainframers alike -- has questions. Products delivered this year will have Ascii capability,

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but a bysynchronous-like capability (i.e., IBM compatibility) is promised within a year. A significant amount of testing logic and formatting capability is contained in the MOS memory chips. The printer looks like a dream and is built to be operated with the CRT, providing a full upper/lower case character set.

So users or OEM manufacturers who once looked to the independents for the exact combination of bells and whistles they wanted in a terminal may now be able to get them from a friendly Ma Bell sales rep, right along with communications.

During the formal introduction, as might be expected, AT&T representatives were careful to stress the communications aspect of the new terminal. The company operates under several legal restrictions designed to keep it out of the mainstream of data processing. But the implications of Dataspeed 40 are clear.

IBM, for its part, could push into Telephone territory if it wanted to. It markets a PBX system in Europe, and there are continual rumors that this piece of communications equipment will be introduced into the U.S. Who knows? With any kind of regulatory loosening or laxity, the giants of computers and communications could become equal-sized competitors . . . so busy whacking at each other that all the other competitors could pick up more than adequate pieces.

HONEYWELL, UNIVAC BEEF UP EXISTING PRODUCT LINES WITH SEMICONDUCTOR MEMORIES

In an apparent attempt to keep pace with IBM's move into semiconductor main memory and to extend system life of existing families of central processing units, two mainframers have announced new product line enhancements.

Honeywell, perhaps giving a few hints as to the nature of its yet-to-be-announced new series of systems, unveiled the 6025, a low-cost or entry-level system for its Series 6000 line developed from the large-scale GE offering. Featuring the GCOS multidimensional operating system, a new semiconductor main memory, integrated control units, and a high level network processing capability, the 6025 appears to be designed to fill the price gap between IBM's 370/135 and the 370/145, while competing with the Burroughs 4700 and the Univac 9700. All these systems, interestingly, are in the price range for which EDP/IR forecasts little if any increase in installed base over the next five years (page 5).

The 6025 is intended primarily as a growth path for users of the old GE 400 line and users of larger Honeywell 200 systems. Accordingly, Honeywell has made available several programs to facilitate file-to-file translations and assembly language-to-Cobol conversions; these cover IBM/360 and Univac's Series 70 (the RCA Spectra line) as well as Honeywell's 200, 2000, and old 400 systems.

With a typical medium-sized system price of $21,000 a month on a three-year lease, HIS undoubtedly is trying to beef up the low end of its large systems. This would imply that first-to-be-introduced models of the new series will be in the medium-scale range.

Univac, following a similar strategy, has announced the availability of semiconductor memory for its 9700. Available in 8K byte modules, the resulting cost reductions will range from approximately $400 a month on small systems to over $10,000 per month on systems with near-maximum main storage. Purchase price reductions range as high as $350,000 on the maximum system with one million bytes. In addition, Univac is also offering the semiconductor memory on its recently introduced 9480 medium-scale system.

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EDP industry report

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"THE GRAY SHEET" JUNE 22,1973 • VOL.8,NO.16 P.J.McGOVERN,EDITOR

It's up to the judge

TELEX/IBM TRIAL COMPLETE IN 31 COURTROOM DAYS; CRUX OF CASE APPEARS TO BE RELEVANT MARKET' DETERMINATION

During the National Computer Conference earlier this month, IBM took full-page advertisements in the New York Times and the Wall Street Journal inviting people interested in data processing to "come say hello to IBM and the other exhibitors." Below the listing of 148 other companies exhibiting at the Show, inch-high headline letters stated:

With a cast
like this,
no wonder it's
"The biggest
computer show
on earth."

The message was clear. Much the same idea was noted by one casual observer, looking around the two floors of exhibits, noticing IBM's large but unassuming display: "What's all this talk of no competition in the computer industry?"

It's essentially the same question that was being asked out in Tulsa by IBM during final arguments in the antitrust suit brought early in 1972 by Telex. In more ways than seem possible, IBM's trial counsel -- Thomas D. Barr of Cravath, Swaine & Moore -- emphasized the same points: The data processing industry is competitive; IBM's market share is only 30% to 50% by most relevant measurements; in markets such as plug-compatibles where IBM necessarily started with 100% of the business, "IBM's share dropped continuously and precipitously" as competitors began copying devices and marketing them as replacements; and, let's face it, as "a result of the wide customer acceptance of its EDP products and services, IBM has become a very successful company."

Telex, of course, took a different view. With a legal team headed by Tulsa lawyer Floyd L. Walker, Telex attempted to prove that IBM monopolized the electronic data processing equipment market, including the relevant submarket of plug compatible peripherals; that IBM attempted to destroy its plug compatible peripheral competition by "predatory pricing actions and by product strategy bearing no relation to skill, industry, foresight, improved technology or customer benefit." Because of this, Telex seeks damages of $361 million, trebled, and injunctive relief structured to restore a competitive environment to the marketplace.

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Consolidated in the suit are two IBM counterclaims, filed in January of this year. One alleges unfair competition and theft of IBM trade secrets, the other alleges Telex's infringement of IBM copyrighted manuals. The trial itself closed May 24, after 29 days. Then, as IBM expressed it, "parties submitted voluminous proposed findings of fact and conclusions of law, and on June 18 and 19, 1973, oral argument was had." On Tuesday afternoon, June 19, Judge A. Sherman Christensen, who came out of semi-retirement to hear the case, returned to his home near Salt Lake City. Most observers expect his decision within 30 to 60 days.

The Telex plea

Based on various internal and IBM forecasts introduced into evidence, Telex says it was affected by IBM marketing plans and product strategies involving the 2319A (three-spindle version of the 2314 disk drive with significantly lower per-spindle pricing), the 2319B (the integrated controller version of the 2319 introduced with the 370/145), the 3420 tape drive, the fixed-term and extended-term leasing plans (FTP and ETP), and SMASH (IBM's announcement of Virtual Storage 370 models 158 and 168, with their Mosfet memories and "excessive" minimum memory requirements). Telex calculates its damages as follows:

Deprivation of Market Share	$257.7 million
Lost Rental Profits	92.3 million
Lost Sales Profits	11.3 million
TOTAL DAMAGES	$361.3 million

During oral argument, as well as during the trial itself, the Judge attempted to understand how these figures were derived . . . to understand whether, perhaps, part could be attributed to IBM actions and part to Telex's management (to which IBM claimed any marketplace problems should be attributed). Telex continued to advocate that if any damage were done, IBM should suffer the full consequences . . . so no attempt was made to allocate the damages in that way. It looks to EDP Industry Report -- even though the Judge specifically warned against drawing any conclusions from questions he asked at the hearings -- as if damages, if they are awarded, would not reach the proportions shown above.

In addition to damages, Telex has asked for equitable relief, "in order to create a competitive environment" in the marketplace. To do this, Telex says, "IBM's ability to exert monopoly market power and control the plug compatible industry . . . must be curtailed by implementation of permanent injunctive relief." Specifically, the Tulsa-based manufacturer says,

§ IBM must be prohibited for 15 years or longer from entering into any leases for periods greater than 90 days if they impose penalties that require the lessor to pay early termination charges.

§ IBM must be prohibited from enforcing or collecting any penalty payments because of early termination of existing long-term leases such as the FTP, ETP, and Term Lease Plan.

§ At the time of an initial product announcement IBM must describe all planned or anticipated product enhancements ("mid-life kickers").

§ At the time of initial product announcement or when a product is released for production by manufacturing (whichever is first) IBM must disclose the details and design of its CPU interface.

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§ IBM must be required to set prices for its optional internal or "under the cover" products at the same level of mark-up over manufacturing costs that it prices an external equivalent product.

§ IBM must be required to divest itself of a sufficient part of the plug compatible peripheral market to restore "a healthy, competitive marketing environment. This must be accomplished by reducing by July 1, 1978 (each year proportionately) IBM's share of the total number of [such units] installed and attached to an IBM central processing unit to such a level that IBM's installed base [whether sold or leased] will constitute not more than forty per cent (40%) of the total . . ."

That's what Telex wants: One billion dollars and change (under the treble damage provisions of antitrust laws), no long-term leases from IBM, and a requirement that IBM can't supply more than 40% of the peripherals -- tapes, direct access storage products, printers, memories, or communication controllers -- installed on all the CPUs it has built within five years.

Some of these requests sound as if they were taken from the Computer Industry Association's proposed measures for early relief in the Justice Dept. case (EDP/IR Feb.2,1973). It is certainly probable that one set reflects thinking in the other. The last item above, however, has significant implications.

In its arguments about relevant market (see page 8), IBM followed one line of reasoning that peripherals represent between 50% and 75% of the cost of a computer system, so that "competition between systems manufacturers is, principally, peripheral competition." That as it may for the moment, there is definitely a trend toward more of a system being represented by peripherals -- especially when memory is included. Thus, the marketplace dollars involved are substantial.

Even without a detailed analysis, it's easy to show orders of magnitude. IBM's U.S. installed base was about $18 billion in 1972, and at published industry growth (EDP/IR Mar.30,1973), it should reach the $33 billion level by 1978. Roughly $11.5 billion of today's IBM base is represented by peripherals, and some $23 billion of the 1978 base would be. So, during the next five years, non-IBM manufacturers would have to ship in excess of $10 billion worth of plug-compatible peripherals to accomplish the Telex request. It's worth some thought.

IBM's counterclaim

In its counterclaim, IBM asks for damages and recoverable "unjust enrichments" totalling about $47 million, and injunctive relief. "Telex's business strategy," IBM says, "is to offer inexpensive copies of IBM's products." The company can do this, the argument goes, because IBM does the system design plus operational and diagnostic software, gives Telex a product that "is proven technically and does not require any pioneering research or development effort," and reduces the job of Telex salesmen to one of convincing customers they can get a "Cadillac at Ford prices."

But the life cycle of the Telex product, IBM points out, is dependent on that of IBM's, "since Telex does not market products of independent design but rather waits until IBM has designed a product which Telex thinks it can replace." Therefore, IBM says, Telex tries to get IBM specifications and plans as soon as it can . . . "even if possible, before the products are announced to the public." Telex's desire, then, "is reflected in its recruiting program . . . in [which]

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Telex has been searching not for skill per se but for information about IBM technology and IBM's plans for providing that technology to customers."

In doing this, IBM claims, Telex misappropriated IBM trade secrets and proprietary information, fraudulently concealed this misappropriation, and even distributed manuals "substantially similar to, or identical with" IBM's manuals for IBM tape and disk drives. IBM went to great lengths "proving" how Telex paid extremely high bonuses to ex-IBM employees who could duplicate products or disclose information about future offerings.

IBM says, for example, that Telex hired an IBMer who had extensive information about disk development programs code named Winchester, Iceberg, Apollo, and Midas. (And except for certain characteristics of Winchester disclosed as part of the announcement of the 3340 disk in March, 1973, these have remained secret and confidential IBM development programs.) In early 1972 he became director of the "Telex Technology Center [which] was to become the focal point for the dissemination of information relating to IBM's unannounced disk programs known to Telex employees." IBM describes what happened:

> Thereafter, on March 21 and 22, 1972, Telex's President Jatras wrote and Board Chairman Wheeler signed a letter to top executives of Digital Equipment, Honeywell Information Systems, Xerox, Siemens Data Group, Burroughs, Univac and International Computers explaining the purpose of the Telex Technology Center.
>
> Wheeler proposed a joint venture whereby these companies would share the information relating to IBM's unannounced disk products known to Telex employees. Those wishing to participate were required to pay an entrance fee of $250,000 and to share future expense.

In addition to its damage and other monetary claims, IBM has requested injunctive relief from Telex. It would include returning all documents containing IBM confidential material; destroying all copies of manuals that infringe IBM copyrights; and refraining from copying any IBM copyrighted materials and from soliciting or using any confidential or proprietary information. In addition, IBM would have Telex refrain from:

+ hiring or soliciting any IBM employee for five years without approval from the Court;

+ assigning any former IBM employee employed now or in the future to the development or manufacture of products functionally equivalent or similar to those on which the employee worked at IBM for a period of not less than three years following his termination of employment with IBM.

Finally, IBM would have the Court approve a third party, selected by both parties, who for three years would conduct periodic audits of Telex's files and documents to ascertain that Telex has ceased using IBM confidential information in its business.

What happens next?

As the two days of oral arguments began in Tulsa, many people expected to hear at least a tentative decision from Judge Christensen. Indeed, when the lawyers had each used up their allotted time, the Judge paused, then confirmed

(Continued on page 8)

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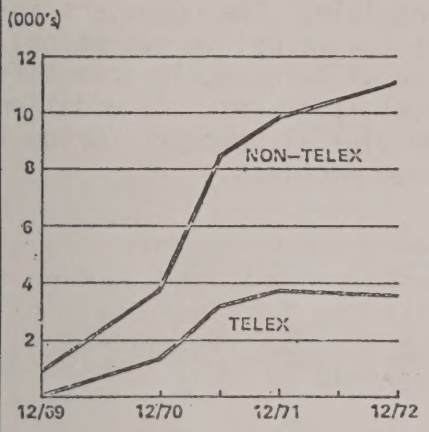
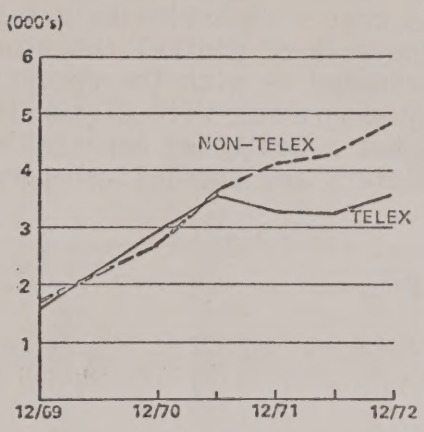
SAME NUMBERS, DIFFERENT STORY THROUGH PRESENTATION EMPHASIS

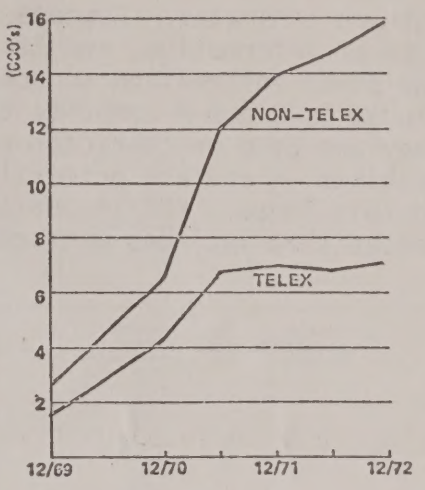
NON IBM DISK DRIVE SPINDLES INSTALLED ON CPU's MANUFACTURED BY IBM



NON-IBM TAPE DRIVES



NON IBM TAPE DRIVES AND DISK DRIVE SPINDLES INSTALLED ON CPU's MANUFACTURED BY IBM



TAPE DRIVES -- 240X,2420,3420 TYPE
(Totals Installed on IBM CPUs)

	12/70		6/71		12/71		6/72		12/72	
	Units	%	Units	%	Units	%	Units	%	Units	%
IBM	36,726	89.8	35,742	86.3	36,403	86.0	37,944	86.1	39,670	85.1
PCM	4,169	10.2	5,668	13.7	5,931	14.0	6,116	13.9	6,952	14.9
TOTAL	40,895		41,410		42,334		44,060		46,622	

DISK DRIVES -- 2311,2314/2319,3330 TYPE
(Totals Installed on IBM CPUs)

	12/70		6/71		12/71		6/72		12/72	
	Units	%	Units	%	Units	%	Units	%	Units	%
IBM	65,686	93.2	63,574	85.5	65,941	84.2	66,622	82.7	68,002	82.5
PCM	4,833	6.8	10,748	14.5	12,402	15.8	13,967	17.3	14,445	17.5
TOTAL	70,519		74,322		78,343		80,589		82,447	

THE PRESENTATIONS reproduced above illustrate how lawyers from IBM and Telex took the same set of numbers (introduced in evidence) to "prove" their points.

Telex used the two tables to show IBM's dominant position in peripherals when compared to that of the Plug Compatible Manufacturers (PCM), and the way IBM's introduction of the Fixed Term Lease Plan (mid-1971) and the 2319 nipped in the bud the inroads PCM's were making into this "relevant market." As the numbers indicate, PCM tape drives and disk spindles almost plateaued as a percentage of installed base after June, 1971.

IBM, with graphs (top) broke out the Telex numbers from those of the other PCM's and said, essentially, "NO!" It argued that internal problems and management decisions halted Telex's growth while the other PCM's continued to increase their installed base along healthy growth curves.

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GENERAL PURPOSE COMPUTER CENSUS

Counts in the General Purpose Digital Computer (Group A) Census, shown below, are based on the best information available to the International Data Corporation, but are estimates. Computer manufacturers, as a rule, do not directly supply this type of information, and it is only through the use of IDC's extensive data files and other information sources that such estimates are possible. The computers included in Group A comprise the bulk of digital computers (by value) in operation. They are byte or character oriented -- with the exception of large-scale scientific machines -- and are primarily programmed with higher-level languages. In addition to this Census, EDP/IR publishes a Dedicated Application Digital Computer (Group B) Census that includes minicomputers and specialized-purpose machines.

AS OF APRIL 1, 1973

NAME OF MANUFACTURER	COMPUTER MODEL	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Burroughs	B-100 Series	$ 3,300	9/64	6	0	6	X
	B-200 Series	$ 5,600	11/61	127	83	210	X
	B-300 Series	$ 5,200	7/65	450	70	520	X
	B-500	$ 6,000	11/68	480	460	940	X
	B-705	$ 1,200	3/73			NA	NA
	B-711	$ 1,400	3/73			NA	NA
	B-1712	$ 1,950	8/72	95	5	100	265
	B-1714	$ 2,200	9/72	55	5	60	160
	B-1716	$ 5,300	2/73	10	0	10	35
	B-2500	$ 8,200	2/67	270	125	395	X
	B-2700	$ 8,700	8/72	32	21	53	70
	B-3500	$ 14,700	5/67	575	350	925	X
	B-3700	$ 21,000	11/72	25	5	30	80
	B-45/4700	$ 27,000	10/71	85	36	121	60
	B-5500	$ 35,000	3/63	103	34	137	X
	B-5700	$ 29,500	12/70	23	6	29	10
	B-65/6700	$ 50,000	11/69	47	42	89	18
	B-7700	$120,000	2/72	1	0	1	3
	Subtotal			2,384	1,242	3,626	701 +
Control Data Corp.	G-20	$ 19,600	4/61	3	6	9	X
	1604/A/B	$ 42,000	1/60	18	4	22	X
	31/3150	$ 9,000	12/64	91	43	134	X
	3170	$ 17,500	12/70	16	9	25	3
	3200	$ 14,700	5/64	57	43	100	X
	3300	$ 28,800	9/65	108	94	202	X
	3400	$ 23,700	11/64	6	9	15	X
	3500	$ 26,000	1/69	10	15	25	1
	3600	$ 48,000	6/63	20	16	36	X
	3800	$ 53,000	12/65	27	3	30	X
	6200	$ 39,000	11/70	2	7	9	X
	Cyber-72	$ 32,900	10/71	8	16	24	8
	6400	$ 54,000	5/66	61	47	108	X
	Cyber-73	$ 47,000	3/72	8	17	25	12
	6500	$ 68,000	12/67	18	10	28	X
	6600	$115,000	8/64	59	33	92	X
	Cyber-74	$105,000	3/72	3	7	10	5
	6700	$125,000	7/70	2	1	3	X
	7600	$165,000	1/69	11	4	15	X
	Cyber-76	$165,000	3/72	1	0	1	3
	Star-100	$250,000	8/73	-	-	-	1
	Subtotal			529	384	913	33
Digital Equipment Corp.	PDP-6	$ 10,000	10/64	16	9	25	X
	1040/1050	$ 13,300	10/67	164	69	233	12
	1055	$ 22,000	12/71	16	4	20	8
	1070/1077	$ 30,000	6/72	7	1	8	6
	Subtotal			203	83	286	26
Friden	System 10	$ 2,500	10/70	600	400	1,000	500
Honeywell Information Systems	Gamma 10	$ 2,500	7/64	0	1,020	1,020	X
	G-5X Series	$ 1,550	1/66	350	2,550	2,900	200
	G-100 Series	$ 4,000	4/66	380	1,690	2,070	X
	G-200 Series	$ 13,700	4/61	222	53	275	X
	G-405/410	$ 9,000	2/68	20	7	27	X
	G-415/420	$ 14,000	5/64	166	198	364	X
	G-425/430	$ 17,000	6/64	67	99	166	X
	G-435/440	$ 22,000	9/65	60	40	100	X
	G-615	$ 55,000	6/69	11	22	33	X
	G-625	$ 65,000	4/65	2	3	5	X
	G-635	$ 80,000	5/65	57	13	70	X
	G-645	$120,000	7/66	3	1	4	X
	G-6025	$ 21,800	11/73	-	-	-	NA
	G-6030/40	$ 33,000	6/71	38	39	77	56
	G-6050/60	$ 46,500	7/71	28	18	46	27
	G-6070/80	$ 61,500	7/71	7	5	12	7
	G-6180	$100,000	2/74	-	-	-	3
	G-Subtotal			1,411	5,758	7,169	293
	H-105	$ 2,500	11/71	410	115	525	190
	H-110	$ 2,600	9/68	210	170	380	X
	H-115	$ 5,300	3/70	1,110	325	1,435	155
	H-120	$ 4,600	1/66	540	205	745	X
	H-125	$ 7,900	12/67	125	310	435	X
	H-200	$ 6,400	3/64	560	260	820	X
	H-2020	$ 2,350	2/73	10	0	10	NA
	H-2030	$ 5,050	1/73	20	5	25	NA
	H-2040	$ 9,000	4/72	130	44	174	95
	H-1015	$ 12,500	4/71	100	45	145	X
	H-2050	$ 14,100	4/72	74	28	102	55
	H-12/1250	$ 12,000	2/66	360	166	526	X
	H-2015	$ 17,800	2/71	130	40	170	X
	H-2060	$ 18,500	4/72	27	7	34	20
	H-2200	$ 19,600	1/66	134	61	195	X
	H-2070	$ 23,000	5/72	30	5	35	19
	H-3200	$ 26,900	2/70	73	36	109	6
	H-4200	$ 31,000	9/68	40	5	45	0
	H-2088	$ 44,000	4/72	6	2	8	6
	H-8200	$ 73,000	2/69	23	4	27	X
	H-4/1400	$ 13,200	12/61	39	24	63	X
	H-800	$ 28,500	12/60	43	11	54	X
	H-1800	$ 46,000	7/64	7	3	10	X
	H-Subtotal			4,201	1,871	6,072	546
	HIS-Subtotal			5,612	7,629	13,241	839

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AS OF APRIL 1, 1973

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IBM	System 3/6	$ 1,530	12/70	2,000	1,450	3,450	900
	3/10	$ 2,200	1/70	9,800	4,720	14,520	2,500
	360/20	$ 3,700	12/65	6,200	5,040	11,240	X
	360/22	$ 5,800	7/71	1,300	310	1,610	300
	370/115	$ 6,650	2/74	-	-	-	NA
	360/25	$ 7,500	10/68	1,680	1,260	2,940	X
	370/125	$ 9,800	4/73	-	-	-	2,500
	360/30	$ 11,000	6/65	4,080	2,900	6,980	X
	370/135	$ 14,600	5/72	1,460	625	2,085	2,200
	360/44	$ 14,300	7/66	84	84	168	X
	360/40	$ 19,600	6/65	2,355	1,950	4,305	X
	370/145	$ 24,700	7/71	1,405	630	2,035	910
	360/50	$ 32,100	8/65	845	620	1,465	X
	370/155	$ 51,700	2/71	1,135	465	1,600	]
	370/158	$ 59,200	4/73	-	-	-	] 750
	360/65	$ 69,000	11/65	450	225	675	X
	370/165	$ 89,800	6/71	204	56	260	]
	370/168	$115,500	7/73	-	-	-	] 180
	360/67	$112,000	6/66	53	10	63	X
	360/75	$ 94,000	1/66	30	18	48	X
	360/85	$141,000	10/69	7	6	13	X
	360/9X	$150,000	11/67	13	3	16	X
	360/195	$188,000	3/71	18	4	22	]
	370/195	$192,000	5/73	-	-	-	] 16
	1130	$ 2,300	2/66	3,860	2,080	5,940	X
	305	$ 3,600	12/57	1	1	2	X
	1401	$ 3,700	9/60	1,250	1,420	2,670	X
	1401-G	$ 2,300	5/64	127	68	195	X
	1401-H	$ 1,300	6/67	98	49	147	X
	1410	$ 17,000	11/61	112	61	173	X
	1440	$ 4,700	4/63	392	382	774	X
	1460	$ 9,800	10/63	64	46	110	X
	1620	$ 2,700	9/60	382	250	632	X
	7010	$ 26,000	10/63	14	9	23	X
	7030	$160,000	5/61	4	1	5	X
	704	$ 32,000	12/55	1	1	2	X
	7040	$ 25,000	6/63	12	19	31	X
	7044	$ 36,500	6/63	9	14	23	X
	705	$ 38,000	1/56	5	3	8	X
	7070-74	$ 27,000	3/60	111	39	150	X
	7080	$ 60,000	8/61	50	1	51	X
	7090	$ 63,500	8/60	21	11	32	X
	7094	$ 73,400	9/62	56	6	62	X
	7094-II	$ 79,400	4/64	9	1	10	X
	Subtotal			39,697	24,838	64,535	10,256
NCR	Century-50	$ 1,950	2/71	680	35	715	170
	Century-100	$ 2,980	9/68	1,180	810	1,990	]
	Century-101	$ 2,750	10/72	115	5	120	] 160
	Century-200	$ 7,900	9/69	600	350	950	90
	Century-251	$ 10,000	11/73	-	-	-	NA
	Century-300	$ 20,000	2/72	8	6	14	33
	304	$ 10,000	1/60	10	1	11	X
	310	$ 1,000	5/61	24	9	33	X
	315	$ 5,000	5/62	356	340	696	X
	315-RMC	$ 11,800	9/65	56	52	108	X
	390	$ 800	5/61	247	188	435	X
	500	$ 1,100	10/65	866	1,650	2,516	X
	Subtotal			4,142	3,446	7,588	453 +
Philco	1000	$ 7,000	6/63	15	1	16	X
	210/211	$ 40,000	10/58	11	1	12	X
	212	$ 52,000	1/63	7	0	7	X
Standard Computer Corp.	IC-4000	$ 9,000	9/68	5	0	5	X
	IC-6000	$ 16,000	5/67	3	0	3	X
	IC-7000	$ 17,000	6/69	7	0	7	X
Univac	I/II	$ 25,000	3/61	4	4	8	X
	III	$ 25,400	8/62	41	38	79	X
	SS-80/90	$ 8,000	8/58	29	29	58	X
	418-I/II	$ 13,700	6/63	83	68	151	X
	418-III	$ 19,600	7/69	50	60	110	10
	491/492	$ 27,000	12/61	17	13	30	X
	494	$ 41,400	2/66	51	39	90	X
	1004	$ 1,000	2/63	950	950	1,900	X
	1005	$ 1,630	4/66	740	168	908	X
	1050	$ 8,800	9/63	208	140	348	X
	1103/5	$ 35,000	12/50	0	2	2	X
	1106	$ 40,000	12/69	50	66	116	32
	1107	$ 57,000	10/62	10	13	23	X
	1108	$ 68,000	9/65	142	97	239	4
	1110	$ 79,000	6/72	4	7	11	23
	9200	$ 2,300	6/67	1,550	910	2,460	60
	9300	$ 4,050	9/67	860	890	1,750	60
	9400	$ 11,600	5/69	235	250	485	60
	9700	$ 21,000	8/72	16	8	24	30
	Larc	$135,000	5/60	1	0	1	X
	Subtotal			5,041	3,752	8,793	279
	301	$ 6,600	10/60	190	12	202	X
	501	$ 16,100	6/59	28	1	29	X
	601	$ 40,900	11/62	2	0	2	X
	3301	$ 22,700	7/64	67	0	67	X
	Spectra 70/15	$ 4,000	9/65	17	0	17	X
	Spectra 70/25	$ 7,000	9/65	2	0	2	X
	Spectra 70/35	$ 11,800	1/67	125	5	130	X
	Spectra 70/45	$ 22,600	11/65	300	21	321	X
	Spectra 70/46	$ 37,400	11/68	45	1	46	X
	Spectra 70/55	$ 34,900	11/68	10	2	12	X
	Spectra 70/60	$ 40,500	9/70	19	0	19	X
	Spectra 70/61	$ 47,200	3/71	18	0	18	X
	Spectra 1600	$ 3,600	1/69	67	0	67	6
	Spectra 70/2	$ 11,500	7/71	150	0	150	18
	Spectra 70/3	$ 18,900	10/71	11	0	11	0
	Spectra 70/6	$ 29,300	10/71	48	0	48	7
	Spectra 70/7	$ 36,300	10/71	16	0	16	4
	Subtotal			1,115	42	1,157	35
	Total			6,156	3,794	9,950	314
Xerox	Sigma-5	$ 11,500	8/67	120	36	156	10
	Sigma-6	$ 20,000	11/70	30	5	35	6
	Sigma-6E	$ 6,100					NA
	Sigma-7	$ 24,000	12/66	90	30	120	X
	Sigma-8	$ 19,000	9/71	6	2	8	4
	Sigma-9	$ 44,000	11/71	7	6	13	6
	940	$ 24,000	4/66	75	3	78	X
	9300	$ 8,500	11/64	35	6	41	X
	Subtotal			363	88	451	26
	TOTALS			59,734	41,906	101,640	13,148

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RELEVANT MARKET -- CAN A COMPANY MONOPOLIZE THE MARKET FOR ITS OWN PRODUCT?

The crux of the Telex/IBM antitrust case appears to be a definition of "relevant market." IBM ideally says it is the systems market -- CPUs, peripherals, and certain software plus alternatives such as leasing and service bureaus. Telex says it is IBM plug compatible peripherals -- a market clearly identified in IBM planning documents. IBM is willing to back off, in some of its arguments, and say maybe it's all peripherals . . . or even all disks or all tapes. Interestingly, IBM always comes up with definitions where its market share ranges "between the middle 30s and the middle 40s."

IBM argues economic concepts such as supply substitutability (manufacturers can shift production from one product to another in a reasonable amount of time) and demand substitutability (products and/or services being reasonably interchangeable in the eyes of a user). Telex persevers with its plug compatible concept, pointing out the Calnetics case, where the court held that Volkswagen air conditioners constituted a separate relevant product market. IBM says no, under the line of reasoning that almost every manufacturer, then, is a monopolist (of its own product) and supports its argument with the du Pont case in which cellophane was declared one of many flexible wraps.

The legalities, of course, are much finer, more involved than presented above. But the nub of the case really seems to be whether or not IBM plug-compatible peripherals constitute a relevant market. Even if they do, of course, the decision isn't obvious. IBM argues that it naturally starts with 100% of such a market, if it exists, and that it is losing market share over time. No one in the history of antitrust has ever been held to monopolize a dynamic market that is only three or four years old! Telex, on the other hand, thinks the computer industry is different. It's willing to be first.

those speculations. He had found the procedure useful in the past, since "the passage of time erodes the Court's grasp of the essential facts." But no decision was forthcoming. The Judge wanted to study some more, and expressed concern about creating an "insiders" class among the people present in court. He said he would not release any information as to his decision until he is in a position to file findings of fact, conclusions of law, and "a judgement which satisfies me." But he is known for efficiency, and a decision was expected within 30 to 60 days . . . probably during August.

Who wins if who wins?

Who's going to win the suit? The question isn't that simple. There are two suits, consolidated but not really dependent one on the other; many claims are made under each suit; the nature of damages, also, is very vague. One possibility is for each party to win, with damages washing themselves out. But Judge Christensen isn't likely to "cop out" like that; he seems to realize that he is treading new legal ground, likely to set precedents and/or shape an industry.

If Telex wins the suit, other peripheral manufacturers are waiting to try their luck (even though this case, in appeal, will not guarantee a win), possibly with help from some Telex participants. If IBM wins, there is talk that Telex would fold, then other PCMs. EDP/IR doesn't think things that drastic. These observers seem to forget NCC . . . that the computer industry is competitive. Of course, when there's competition there can be losers.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JULY 17,1973 • VOL.8,NO.17 P.J.McGOVERN,EDITOR

OEM mini prices drop -- page 7

IBM BEEFS UP SYSTEM/3, BOOSTS MEMORY LIMITS FOR SMALLER 370s, BRINGS OUT DOUBLE DENSITY 3330 SUBSYSTEM FOR VIRTUAL STORAGE OPERATIONS

One of the IBM practices complained about by the Computer Industry Association (EDP/IR Feb.2,1973) . . . indeed, one of the areas singled out by Telex in its recent bid for injunctive relief (EDP/IR June 22,1973) . . . is the so-called "mid-life kicker" -- an improvement, part way through a product's marketing life, that brings the user more for his money . . . but serves to thwart competitors who have only recently mimicked the original product.

These actions by IBM, say Telex and the CIA, are unfair competition . . . as well as a penalty against users who purchase equipment early in its life cycle. IBM for its part says essentially that it continues to bring customers the latest technology. Perhaps the courts will eventually decide.

Meanwhile, IBM has continued to enhance its product lines. During the last week or so, at least three announcements -- all more or less anticipated or rumored -- have filled in obvious "gaps," and perhaps made life even more difficult for the independent plug-compatible manufacturers:

- A new member of the System/3 "family," the Model 15 can have up to 131K bytes of Mosfet (semiconductor) memory, giving the S/3 user as much main storage as previously had been available on the 370/125. Along with the additional main memory, the 3/15 provides some multiprogramming capability and up to 91.7 million bytes of disk storage . . . but doesn't venture into virtual storage.

- Smaller members of System/370 -- the 115, 125, and 135 -- each get "increased real storage capacities" more or less double what they had. For the 135, this new memory takes advantage of the extended bipolar circuitry from the 145's memory extension announced earlier this year, and effectively halves the incremental cost.

- Finally, IBM today announced a Model 11 3330-type subsystem -- with new packs as well as drives -- that doubles the number of cylinders, or tracks, bringing the capacity of each pack to 200 million bytes at a price increase of only 35% to 40% per drive.

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IBM GIVES SYSTEM/3 MULTIPROGRAMMING, MORE DISK, AND MOSFET MAIN MEMORY

> *We feel that IBM opened an important new market with the introduction of System/3 [in 1969] . . .*
>
> *Therefore, we predict that the name "System/3" will, in the not-too-distant future, become generic, that it will be used synonymously when referring to the System/3 or any competitive system, just as the term "IBM card" has. The name will be the same but it will be equipped with an ABC line printer, a DEF card unit, a GHI tape drive, a JKL disk drive and, conceivably, even a central processing unit manufactured by an independent manufacturer.*
>
> *The future of System/3 is an exciting one. I feel very confident [that] the System/3 will have a lifespan of 30 years.*
>
> -- "Message From the Publisher," David E. Ferguson
> System/3 World, Volume 1, Number 1, July 1973

Just as the message above -- and the new magazine it introduced -- was being delivered to 13,000+ people at selected companies "utilizing or involved with the IBM System/3 computer," IBM was doing its part to make Ferguson's statement come true. IBM announced the System/3 Model 15. It's a pretty big "top" for what might be called a computer family.

IBM, for example, says the Model 15 provides "an easy growth path" for users of the 360/20 "since the same 80-column multifunction card machine and 2501 card reader now installed on their systems can be attached to the Model 15." Its Mosfet main memory (a la the 115 and 125) comes in memory increments up to 131K (almost three times what was available); it has disk storage of up to 91.7 million characters. Couple these attributes with new multiprogramming capabilities, says IBM, and you have a dandy machine for remote data entry or teleprocessing.

To provide an indication of how it expects users to put systems together, IBM supplied, as usual with system announcements, a breakdown of two "typical" configurations. It's pretty obvious neither is a "bare bones" minimum or a "full-blown" maximum, but they indicate what users might be receiving when deliveries start during first quarter of next year. The system does not fall under IBM's four-year term lease (EDP/IR Mar.8,1973) announced for virtual storage computers.

+ A small system -- with 48K CPU, the new keyboard/display console, a small 5444 disk drive, 96-column multifunction card machine, and the new 465 lpm 1403-5 printer -- rents for $3,240 per month.

+ A large system -- with 128K of memory, the console, 80-column MFCM, 1100 lpm printer, four 5445 removable pack disks plus two smaller disks for the full 91.7 bytes of memory, and a Binary Synchronous Communications Adapter -- goes for $7,127 a month.

In addition, tape drives, another BSCA, and lots of terminals could be added. So the "maximum" price for the 3/15 could well be up there in the 370/115 range. Indeed, Ferguson -- a self-admitted chauvinist when it comes to IBM's "machine for the masses" -- thinks the 3/15 could seriously impact the potential market for the 115. Despite the phenomenal success of System/3 (chart, page 3), certain users have been reluctant to commit to it, fearing a dead end. The latest announcement, argument goes, precludes this possibility.

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How does this new S/3 affect IBM?

The 3/15 is a different CPU, in that it requires replacement rather than a field upgrade. But it has the same internal speed as System/3, Model 10. So it will be an attractive upgrade for users who simply have grown a too-heavy workload for their current computer but who have not really developed a high degree of sophistication in computing operations. With spooling capability (which allows card I/O simultaneous to processing) and two partitions of memory, the 3/15 looks very much like the 360/30 operating under DOS once appeared.

And, as IBM so much as stated, the 3/15 will be a good way for "plain vanilla" 360/20s -- the unsophisticated ones -- to move up significantly in memory capacity while sidegrading or actually downgrading in cost. This movement actually began when the 3/10 was announced, with the installed base of 20s dropping almost 30% during the last two years. And some 85% of the 10,000+ 360/20s currently installed are on rental. So when 3/15 deliveries get into full swing by this time next year, the 20 base should rapidly begin to dwindle.

Also, the 3/15 will provide homes for many of the 2314/2319 disk spindles coming off rent as the 3330 becomes the real workhorse of the 1970s for the 370s. These older drives are what the 5445 disk drives are made of. There might even be a market here for independents who search out the 3/15 installations.

Little guys need lots of computers

"Diverse" is the word that best describes today's System/3 marketplace. As the histogram on page 4 indicates, S/3 users pay widely varying amounts for their computers -- from below $1,000 a month to well above $6,000. The distribution is roughly bimodal, since there are small card users at one end of the spectrum and heavy disk systems at the other. And the new Model 15 will serve to increase the diversity of the distribution.

A picture of System/3 users by industry is equally diverse, and looks quite different than the profile of all other general-purpose computer users. To get an idea of S/3 penetration by industry, EDP/IR examined data files maintained by the International Data Corporation, its publisher. In the course of preparing a major report on the small business computer marketplace, IDC has compared the incidence of S/3 usage with that of other general-purpose computers. Some of the highlights illustrate the diversity of S/3 use in the U.S.

- The single largest market for System/3 is wholesale, with about 15% of the installed base and nearly three times the penetration, by number, as computers in general.

- High on the list -- with S/3 use more than one-and-a-half times that of general-purpose computers -- are retail, transportation carriers (excluding airlines), medical, health, and "other" services. These categories account for almost another 15% of S/3 use.

- Industrial companies, in general, account for nearly half the S/3s in the U.S., versus only one-third for other general-purpose computers. The highest penetrations are in the "miscellaneous" categories, not in metals, chemicals, petroleum, transportation equipment, or the other "big business" sectors. These small computers are used by all those small manufacturers scattered across the land.

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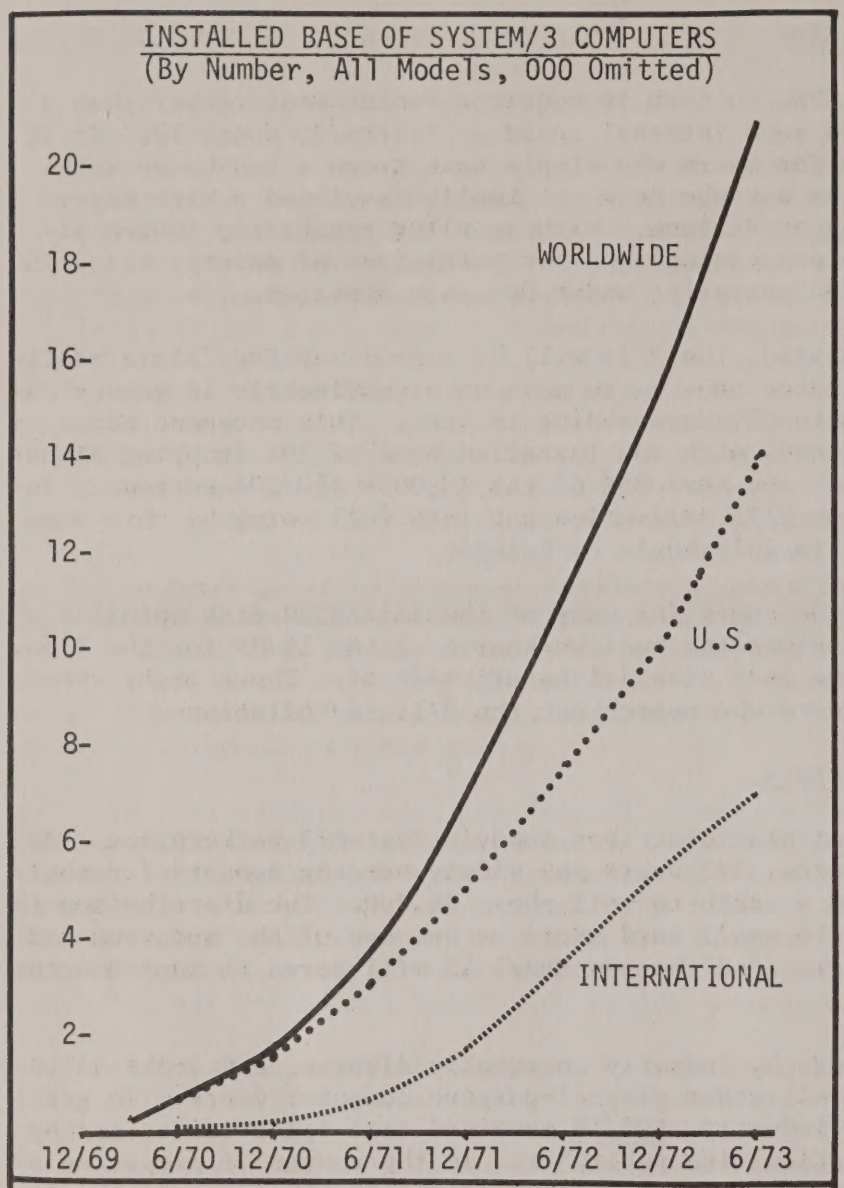

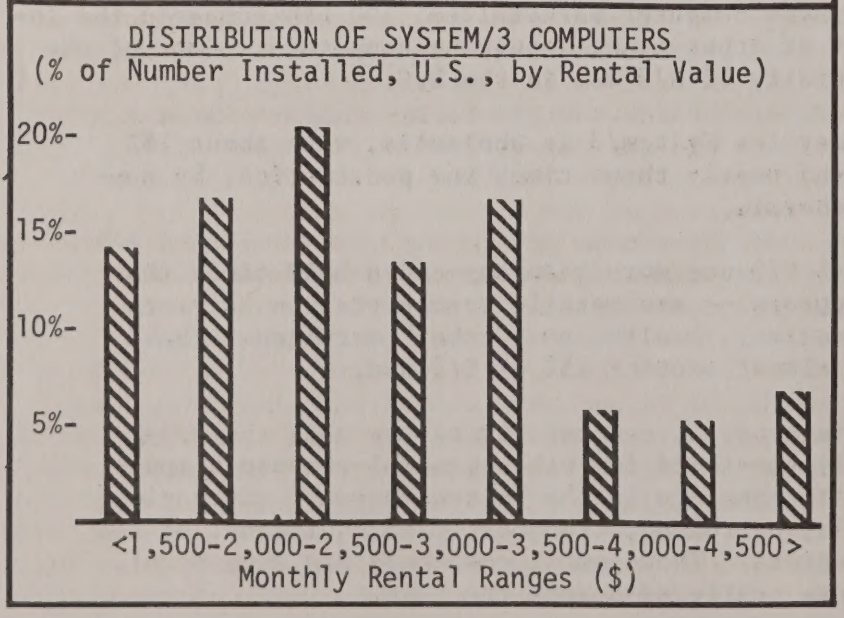

SYSTEM/3 -- EVER ONWARD?

With its announcement of System/3, Model 15, IBM seems to be insuring a rosy future for what probably should be called a computer family (page 2).

The total number of S/3s installed worldwide swept past the 20,000 mark this spring according to IDC estimates (upper chart), and no limit appears in sight. (The chart is based on "retrocasts" of data from the General Purpose Computer Census published regularly in EDP Industry Report.)

BIMODAL DISTRIBUTION of System/3s installed in the U.S. shows up in the chart (at left) based on data maintained by the International Data Corp.

Card systems predominate at lower rental ranges, but more "loaded" disk configurations give 35% of the systems a $3,000/month or greater rental. Thus, the new $4,500/mo. average (see text) isn't the "giant step" it seems.

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- State and local government, miscellaneous business services, and "other" financial (see below) have about 15% of the market, with slightly lower penetration than computers in general.

- Banking, insurance, airlines, utilities, and education -- with less than 10% of the market -- have only about one-third as many S/3s as they do computers. And the Federal Government, as a matter of policy, doesn't believe in using the System/3. In the latest Inventory of U.S. Government Computer Systems, one, lone model shows up at an Army fort . . . located, appropriately, in Texas.

The System/3 marketplace is diverse, indeed. IDC estimates that in the U.S. today some 90% of all these systems are used primarily in a batch, stand-alone environment. And IBM -- as evidenced by its latest commitment to the non-370, non-VS but ubiquitous System/3 -- seems set on changing this. In the Model 15 announcement, IBM's top marketeer, DP Div. president Ralph A. Pfeiffer, Jr., says:

> *Many small businesses have grown significantly since becoming first-time computer users after the introduction of System/3 in 1969. Additional capacity of the Model 15 will serve their needs, while large companies with numerous remote locations can use the Model 15 as an economical answer to their teleprocessing requirements. The Model 15 thus becomes a system which can serve both our smallest and largest data processing users.*

In the process, it seems to EDP/IR, IBM is developing a family of computers. It may try to link them together with communications, more dependent on big, centrally located 370s, but a base is already there . . . a base sufficiently large to supply Ferguson's ABC, DEF, GHI, and JKL companies with a market for their products . . . a base perhaps isolated enough to become a separate entity, ready to compete with System/370 from below.

"DOUBLE CAPACITY" 3330 PROVIDES LOWER COST PER MEGABYTE AND EASY UPGRADE

When IBM quietly introduced the "Model 11s of the 3333 disk storage and control, the 3330 disk storage, and the 3336 disk pack," everything seemed obvious: It was a so-called double-density solution accomplished by increasing the number of cylinders, or tracks in each pack . . . but keeping track length and format the same as with the earlier model. A new feature enables independent operation during "erase" mode, but the drives are "functionally similar to previous models" . . . which can be field upgraded to the new specs.

A new disk pack, or a $650 recoating of an old one, is necessary; but nothing in the announcement seemed a big hindrance to the independent manufacturers who know the original product well. Indeed, there is none; and announcements of plug-compatible Model 11s can be expected any time.

But there is a little quirk that will need watching. While an IBM spokesman was discussing the product with EDP/IR, he pointed out that rental customers pay no conversion charge when the new unit is available next March, and owners of older 3330s can have their units converted for $26,000 per two-spindle unit, half the cost of a 3330 today.

What about 3330s on one of the term lease plans? We asked about this. The IBM representative turned to his policy manuals or something, then stated that

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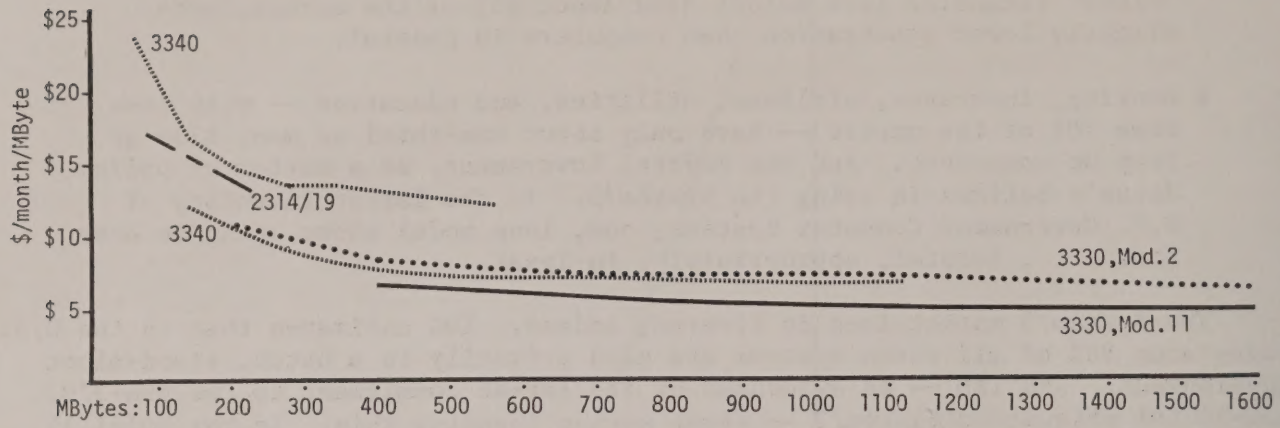
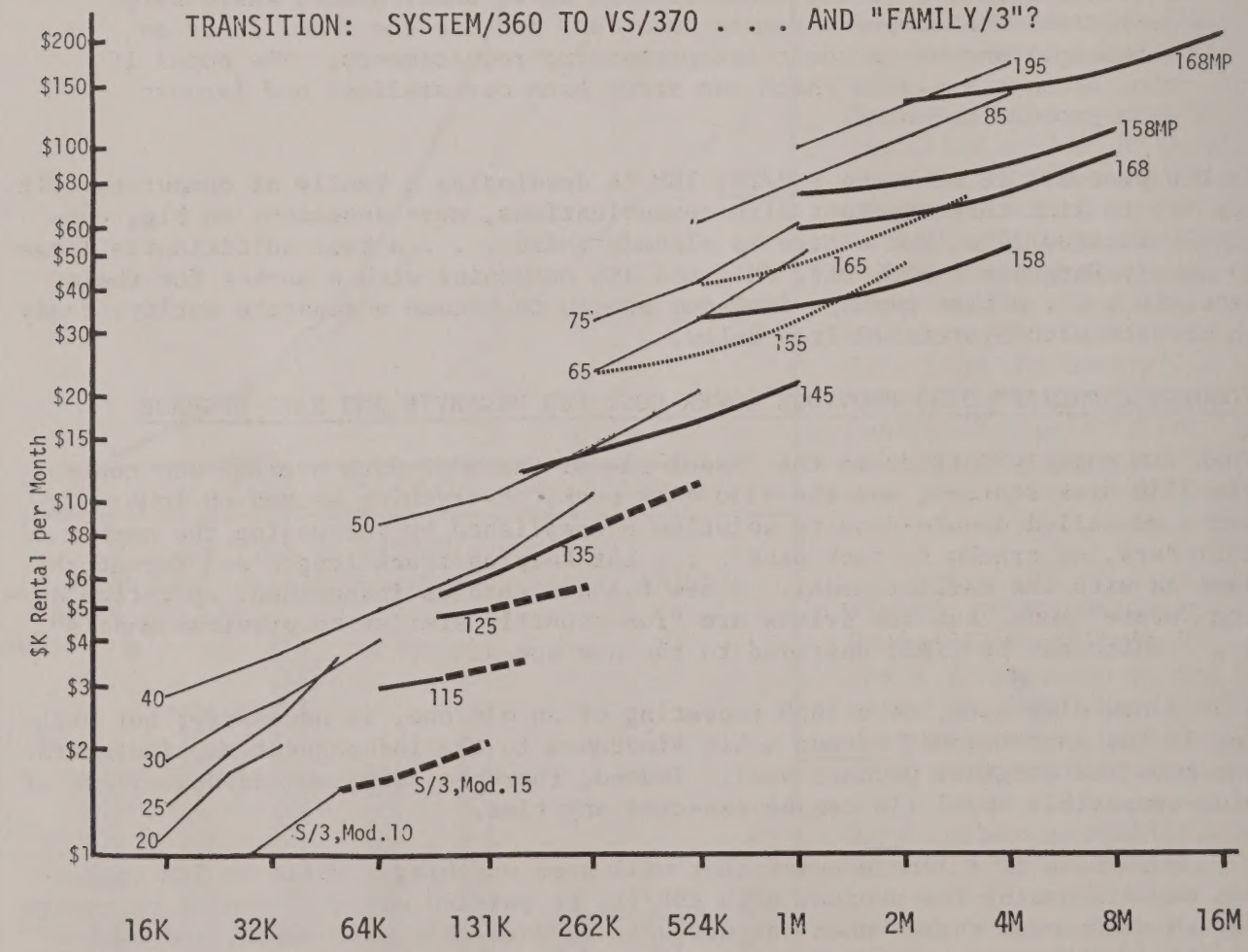
COMPARISON OF MONTHLY DISK STORAGE COSTS -- 370/135
(Based on ISC, ETP/FTP Prices, One Disk Pack per Drive)



MONTHLY COSTS FOR IBM DISK DRIVES, based on 370/135 with ISC, show how the just-introduced double-track-density 3330 drops mass storage costs once more. Cost per megabyte drops from $4.40/m (shown) with 8 spindles to $3.15 with full 16. For discussion of 3340 head-in-pack drive, see EDP/IR Mar.19,1973



SYSTEM/3 TAKES ON A "FAMILY" APPEARANCE as its memory is extended well into the 360/40 range and given a semiconductor "slope." Also plotted above (on a log-log scale) are rental prices for CPU and main memory (including required power supplies and consoles) for IBM System/360 and 370 computers. New memory increments for smaller 370s (•——•), just announced, fill heretofore obvious gaps

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"FTP and ETP both allow field installable changes without penalty." No lease extensions . . . no premiums . . . same treatment as rental customers. Thus, we have a new aspect of term leasing from IBM -- the "lock-in" can be flexible when, for some reason, it behooves IBM to let the user make changes . . . like to add more memory capacity for virtual storage operations. But Model 11 seems to be a "good deal" for the customer -- twice the capacity costs about 40% more; with the new equipment, the same capacity is only 70% as much.

115, 125, AND 135 GET MORE MEMORY, SAME TECHNOLOGIES

The bottom chart across the page really tells the story of what IBM announced along with the new System/3 (page 2). It brought to the small 370s -- the 115, 125, and 135 -- a breadth of memory size more in keeping with that of the larger members of the System/370 family. This "insertion" certainly was anticipated, simply from studying the charts.

The new memories for the 135 use extended bipolar circuitry -- with each chip holding 1,024 data bits -- and drop the incremental cost of memory for this model from 90¢ per byte (purchase) to less than 50¢. The two smaller machines get high-speed Mosfet chips (holding 2,048 data bits a chip) at an incremental price of about 30¢ a byte. Shipments to existing 115 and 125 customers will begin late this year, and all memories -- upgrade and new models -- in all sizes will be going to the field by this time next year. IBM says all of the larger memories will go in existing frames, eliminating the need for extra floor space.

With extra real storage, says IBM, users can keep more of their frequently used data in memory, thus making virtual storage more efficient by reducing the amount of paging necessary. As a result, the press release continues, users will be able to increase the size of their existing systems as they implement new or advanced applications . . . and pay IBM a few more bucks a month.

DATA GENERAL PACES ANOTHER OEM PRICE CUT FOR MINIS

For virtually as long as there has been a minicomputer marketplace, the most recently announced machine in a given size category has generally been the least expensive as first one manufacturer, then another took advantage of the latest manufacturing economies available either to itself or from a supplier. And this trend continues, even today, at least in the OEM market.

In an announcement that seems to stem from the advantage of finally establishing an in-house core manufacturing facility, Data General late in June gave birth to the Nova 2, actually a pair of processor-on-a-card models. Under the pricing axiom stated above, they currently occupy the low price-for-performance slot on the competitive scorecard.

Although available only to educational accounts in quantities of less than five, the single-unit "base" price of the new Nova 2s starts at $3,850 . . . not quite so low as the slightly slower Interdata Model 74 (listed at $3,600), but certainly lower than any Data General predecessor or any from chief DG competitor Digital Equipment (see list, next page). Where the Nova 2 really breaks new ground is in its speed; the processor operates at an 800 nanosecond cycle time.

The following table, prepared by IDC, which is currently in the final stages of a major minicomputer study, gives some of the basic data needed to compare the new DG Nova 2s with their primary competitors. There is an interesting correla-

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tion among date of first delivery, basic price for an operational unit with 4K of memory, and cycle time:

Manufacturer	Model	First Delivery	Cycle Time	Basic Price
Data General	Nova 1210	12/70	1.2 usec	$ 4,350
	Nova 1220	12/70	1.2 usec	$ 5,250
Data General	Nova 2/4	9/73	.8 usec	$ 3,850
	Nova 2/10	9/73	.8 usec	$ 4,750
Digital Equip.	PDP-11/05	4/71	1.2 usec	$ 4,795
Digital Comp. Cont.	D-116	11/71	1.2 usec	$ 4,000
Interdata	Model 74	4/73	1.0 usec	$ 3,600

All are 16-bit machines, so it is clearly the combination of price and speed that will give Nova 2 a competitive edge in the marketplace . . . at least until the next product announcement comes along.

As soon as they came out, the new Nova 2s were compared by some to Computer Automation's Naked Mini/LSI -- the new one-card processor with 4K words of relatively slow, 1.6 microsecond memory and an OEM price of below $1,000 in quantities of 200 or more. Actually, there are similarities and differences.

Data General has followed a concept similar to that used by CAI by putting its entire processor on a single card. But the memory is separate, and uses two cards, each of which can have 4K, 8K, or 16K words. Thus, the maximum memory size available is 32K.

A few other details put the Nova 2 vs Naked Mini/LSI comparison into more perspective. The Nova 2 comes in a box with power supply, peripheral equipment, and all the software available for Data General's other minicomputers. It is a system, and operates at twice the internal speed. The Naked Mini, on the other hand, is a bare component. It can, however, have up to 256K words of memory and comes -- as the Alpha/LSI at just under $2,000 in large quantities -- with full power supply and panel. So, considering the relative speeds and the heavy discount structure applicable to the DG price before it can be compared to the quantity prices quoted by CAI, the products seem in line. And because they will be used in different applications most of the time, the two machines can be expected to meet rarely in the market.

The mini marketplace: End user vs. OEM

A lot of noise is being made these days about the minicomputer marketplace becoming increasingly end-user oriented. Why, then, do suppliers continue to court OEM business so heavily? Simple. The OEM market is big business.

Last year, according to IDC estimates, almost 60% of the 9700 minicomputers shipped were OEM; these contributed almost 40% -- around $125 million -- to the minicomputer shipment total measured in dollars. And Data General's share of this OEM sector is steadily increasing, despite the competition. Apparently, Data General intends to keep it that way. So -- since there is still quite a way to go before even today's mainframe technology is transferred to the minicomputer sector -- prices for some time should keep coming down . . . or performance going up . . . or both.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JULY 27,1973 • VOL.8,NO.18 P.J.McGOVERN,EDITOR

The Ryads are coming

SOVIET PLAN CALLS FOR 10,000 MORE COMPUTER INSTALLATIONS BY 1975; GROWTH PROSPECTS ARE REAL; ASPIRATIONS PARALLEL THOSE OF U.S. IN MID-1960s

According to skimpy evidence from recent happenings -- a book's publication and reports from a trade show -- there may not be a Ryad 1040, middle of five models in the Soviet Union's 360-like current generation of computers. Be that as it may, certain facts about the state of the computer art in Russia seem as clear now as they have been in years.

- The state of computer use in the U.S.S.R. is about 10 years behind that in the U.S. Soviet plans for computer use sound very much like the positive pipedreams heard here in the mid-1960s, and the accomplishment of stated goals would leave the U.S.S.R., at yearend 1975, with an installed base only one-tenth that of the U.S. at that time.

- The Soviet approach to third-generation computers -- ES, or Ryad -- includes developments from most of the East European countries. Production of the full line will be handled in Russia, but each of the satellites will manufacture only the particular computer or peripheral it originally developed.

- Even though "prototype" production of some Ryads has begun, none are being built in large quantities, and larger ones are still in design. Software efforts lag far behind. Why? The Number One problem is a tremendous lack of coordination among the various ministries involved.

- Hopes are high for timesharing and teleprocessing; indeed, plans for national networks sound as ambitious as those proposed in the U.S. during the early 1960s and just recently brought near fruition. Yet, the communications plant in the Soviet Union leaves much to be desired.

Much of the apparent Soviet dilemma -- keeping up while trying to catch up -- could be solved if Western, and notably U.S. manufacturers were given their marketing head. But political and ideological differences are vast; trade restrictions abound and fundamental approaches to business are vistas apart. The Soviets want their own industry, to be sure, but there is also the Soviet commitment to computerization, the U.S. need for trade, and the apparent spirit of cooperation that is evolving between the two countries.

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SOVIET PLAN VERSUS U.S. ACTUAL -- A REPEAT OF HISTORY?

	United States			U.S.S.R.		
	Number	Value ($M)	Avg. $K	Number	Value ($M)	Avg. $K
Base Year*	3,810	1,390	365	4,500	1,140	253
Base +2	7,550	2,710	359	8,000	2,000	250
Base +5	18,200	6,100	335	18,000	4,500	250

*1959 for U.S. -- GNP at that time was $484 billion
1970 for U.S.S.R.--GNP at that time was $486 billion

ESTIMATED GROWTH of Group A and B computers in the U.S. during the first five years of the 1960s is compared above to the five-year plan figures the Soviets began working toward in 1970 -- a time at which the U.S.S.R. Gross National Product was virtually the same as the U.S. GNP in 1959. This 300% growth in number and value of computers is actually less than that chalked up by the U.S. during the early 1960s.

During the same five-year period (1970-1975), IDC estimates the U.S. installed base will grow 178% in number and 64% in value as vast numbers of minicomputers are installed, bringing the U.S. base to over 200,000 computers worth $41 billion. Based on these estimates, the U.S. in 1970 had 16 times as many computers as the U.S.S.R., worth 22 times as much; at the end of 1975, the ratios will drop to 11 times (number) and 9 times (value)

Sputnik first but few computers?

After checking with the best U.S. sources of information about the U.S.S.R. computer industry, IDC, publisher of EDP Industry Report, has developed a profile of the computer industry in Russia. And it shows a market that is far behind the well-developed computer markets of the West. Current plans call essentially for matching the progress of the U.S. during its more formative years.

If the estimates above are correct, the Soviet computer base grew from 4,500 systems of all kinds in 1970 to about 8,000 last year -- paralleling closely the installed base growth of the U.S. between 1959 and 1961. Indeed, the Soviet goal of producing 12,000-to-15,000 third-generation systems during the current five-year period sounds much like the plans for IBM's System/360, the hardware emulated by the Russians with their Ryad series.

Plans this ambitious would seemingly put computers at the very top of the priority list in the current Five-Year Plan, yet no specific mention of computers appears in the published version. On the other hand, speeches given at the 24th Congress of the Communist Party of the Soviet Union -- and subsequent press coverage -- indicate that a push is on. There is clear evidence that automation has reached the forefront of planners' thinking, but the major drain from defense and agriculture may restrict the Soviet pocketbook.

Why just now -- so late -- especially for a country with a planned economy in which computers would seem so essential? For over a decade, the communists truly considered computers a capitalist tool for increased exploitation of the

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workers; they blotted out all mention of these machines. Not until the late 1960s did they finally realize how erroneous this thinking was. So now they are trying to catch up.

Next -- the computer race?

Actually, the Soviet plan -- quadrupling its installed base in five years -- is certainly within reason, and essentially on target if current reports are correct. And the Russian GNP is expected to grow rapidly enough to support the growth that has been suggested.

But the very nature of the Soviet economic system could interpose barriers to the attainment of these goals:

- Industrial competition -- not to be underestimated as the major Western incentive for both producing computers and increasing their utilization -- does not exist in the U.S.S.R. Furthermore, there is no basic profit motive to overcome the inherent reluctance to introduce computers into operations.

- Central planning, of course, can theoretically overcome almost any problem such as this opposition to change. But central planning can also suddenly divert resources, as seems to have been done for the agricultural crisis last year. And continuity of emphasis is necessary for the buildup of computers to be successful.

- Assistance from Western suppliers would seem to be one way around many other problems. But ideological problems -- such as the virtual impossibility of leasing when everything is state-owned -- remain a major barrier.

Despite the fact that the Soviets can accomplish, technologically, anything the West is capable of, they have consistently demonstrated a lack of manufacturing knowhow. Mass production remains a major hurdle, and there are indications that the Soviets would rather buy complete plants -- as they have done to meet their automotive goals, for example -- than to order CPU after CPU ad infinitum from the major U.S. or European computer manufacturers.

. . . or cooperation?

To this end, there continue to be rumors that a deal with Control Data -- or perhaps with Multinational Data, of which CDC is a member -- is in the offing. Both sides are playing their cards close to their vest, but some word has leaked out. Reported key elements in the deal are quite revealing:

- Sale of a number of large computers, perhaps to augment or replace Soviet designs for the two larger models of the Ryad series, both of which the Soviets have been extremely close-mouthed about. If the deal goes through, it would confirm speculation that these systems have been in trouble and now have top priority.

- Installation of a Cybernet timesharing network throughout the Soviet Union. This would almost be proof positive that a national economic planning system has far too high a priority for the Soviets to wait for domestically produced equipment.

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THE U.S.S.R's RYAD COMPUTER FAMILY

Model	Closest IBM Equivalent	Operations Per Second	Memory (K Bytes)	Status
ES-1020	360/20	20,000	64-256	Prototype, developed jointly with Bulgaria, announced at start of 1972. In production in Byelorussia, has not appeared in quantity
ES-1030	360/30	100,000	128-512	Prototype completed early in 1972, with Polish help. Production to date only in Armenia and Byelorussia
ES-1040	360/40	250,000 (?--see text)		Unveiled in Moscow, to be made by E. Germany's Robotron factory. Description omitted in recent report
ES-1050	360/50	500,000	128-1024	Prototype recently shown in Moscow. To be produced only in USSR, CDC may help
ES-1060	360/65	2,000,000	256-2048	Still in design stage, for USSR production. CDC help is a possibility

- Exchange of hardware and software technology. On paper, such a deal would get the Soviets out of their present bind with software implementation and -- on paper, at least -- provide some useful basis for CDC's next generation of computer equipment.

Such an agreement -- especially if it included supply of peripherals, as is also rumored -- would definitely thrust CDC into the position of the dominant Western supplier to the U.S.S.R., a position currently held by ICL of the U.K. But it is highly unlikely that the U.S. Government will okay the full deal. A timesharing network of Cybernet's magnitude -- based on many supercomputers -- is likely to cause a few heads to shake. The U.S. fears shipment of large computers to the Soviets will further their defense efforts and it requires positive proof that all U.S.-built computer equipment will have no defense use. So for a timesharing system, that means knowing and controlling the use of each terminal.

The Ryads are coming!

The table, above, describing the ES, or Ryad, series of third-generation computers, is taken from a 1972 Russian book and reported in Soviet Cybernetics Review by Wade B. Holland, the publication's editor. Except for the data on the 1040, which is taken from other sources. On this, Holland says:

> It must be noted that one machine is missing, the ES-1040. This machine is in the middle of the five-machine series, which is based in many re-

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spects on the IBM/360 series. There is no explanation for the omission, nor is the 1040 even mentioned. The two smaller machines, the ES-1020 and ES-1030, are in production, although neither has yet been noted in an operational status. The 1050 and 1060 are not believed to be anywhere near the production stage.

The 1040 would logically be assumed to be the next machine to be formally announced and to be going into production. Earlier information indicated that it is a joint development of the East Germans and the Soviets, and it is possible that its omission from the present table means that Soviet participation is minimal. However, the table clearly indicates that the data given are "proposed" specifications for the machines, and thus there would not seem to be much reason for not including it.

Subsequent reports, Holland says in a late-breaking preface to the May issue in which the above was reported, are that the 1040 was definitely displayed at the Exhibition of National Economic Achievements in Moscow. In any event, he points out, the Soviets have acknowledged that only the 1010 (a minicomputer from Hungary) and 1020 machines are actually in production.

Despite its supposed acceptance for production last summer, the 1030 is apparently still not being manufactured. This would indicate that the 1040 unit, if present, is also a prototype, and thus the display is possibly based on only two machines that are in [production].

From each according to his ability

The Ryad concept -- originated in 1968 -- makes a lot of sense. The U.S.S.R. and the Eastern European (Comecon) countries would cooperate to produce a compatible family of computers patterned after IBM's System/360. All computer-related production resources would be focused on compatibility; individual country assignments would take maximum advantage of existing expertise; the resulting developments would reduce communist dependence on the rest of the world for products so essential to the very nature of planned economies.

In addition to working directly on joint development and duplicate production of at least smaller models of Ryad, the Eastern European countries contribute much to the overall effort:

- Poland, having benefited from earlier ICL assistance, will be a major source of peripherals, manufacturing more than 25 different devices according to one report.

- Hungary, with no general-purpose mainframe experience, will concentrate on minicomputers, display terminals, and memory. Its small Videoton 1010B computer is sometimes claimed to be part of Ryad.

- Bulgaria, in addition to the ES-1020 development, is contributing tape and disk drives to the project.

- Czechoslovakia has expertise with electromechanical peripherals such as card readers, keypunches, teletypewriters, and paper tape readers. It also may be supplying some integrated circuits. And its ZPA 6000 series of computers will be Ryad-compatible. The first model, now

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entering production, is sometimes referred to as the R-20A or even named into Ryad and called the ES 1021.

- The German Democratic Republic has by far the most highly developed capabilities of Eastern Europe in magnetic media peripherals, integrated circuits, and ferrite core memories. In addition to contributing this to Ryad, its Robotron factories produce the computer that apparently will be the ES-1040.

- Romania, to remain more independent, specifically opted out of the project from the beginning, as she often has with such economic cooperation programs. But some peg her as a source of components.

Problems from a good plan

To this concept of country-by-country cooperation, the Soviets evolved a plan around emulation of System/360. This offers numerous advantages.

Emulation is a proven technique for narrowing industrial gaps, as the Japanese have clearly demonstrated. Choosing a single series to copy precludes many of the snags that might occur in simply trying to achieve compatibility between different products; and picking IBM for emulation means there are alternate sources for elements -- such as independent peripheral equipment and canned software packages -- that might take longer to develop.

Sounds like a good plan, but the project is probably a year-and-a-half behind schedule already. Only two of the five models are in production. What happened? From press reports, it appears that peripheral equipment and software -- even for the two models in production -- are barely existent. There is a lack of coordination among the various ministries involved. In addition:

- Integrated circuits are a primary bottleneck. Soviets have only recently gained enough experience to produce these in quantity, and other Comecon countries do not produce enough to fill the gap.

- Nationalistic interests among Eastern Europeans, in all likelihood, have pushed Ryad into a role secondary to development of indigenous mainframes. This possibly accounts for the 1040 mystery.

- Lack of sufficient mathematicians, and the preference of those who do exist to work in industry for higher salaries, is an excuse offered for lagging software development. There are reports of machines delivered with no software whatsoever.

There is simply a fundamental and recurring inability to cope with the problems of mass production in any industry . . . and computer responsibilities are spread among many different ministries. Research, engineering, production, and marketing of products have all been performed by totally separate enterprises, each with its own output quota.

To facilitate exports, the Soviets say that by 1975 they will realign some of these into enterprises similar to corporations; so perhaps time will evolve greater incentive to improve quality and coordination. But whatever organizational changes do occur will be too long-term to help solve today's problems with Ryad. Also, this move toward decentralization may, as before, prove transient.

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THE RUSSIAN YEN FOR TIMESHARING

The first Russian-built timesharing system -- based on a Minsk 32 with 40 terminals -- went into operation in 1972, ten years later than in the U.S. But computerization under the current Five-Year Plan emphasizes production control systems and establishment of a national information network for the various state planning organizations.

This national network for economic and management planning, according to reports, will be developed throughout this decade and involve terminals galore from approximately 40,000 manufacturing plants, government agencies, construction departments, retail outlets, and finance and service centers. The system will involve some 800 regional computer centers, all tied together by a huge national telecommunications network.

Even discounting this plan for a certain amount of exaggeration, it is offered in the face of almost insurmountable odds. The highest data rate on the public-switched communications network is 200 bps, with 300-to-600 bps allowable in special circumstances. Even on private lines, the absolute maximum transmission rate is 1200 bps. This is well below even the 2400 or 4800 data rate available on private lines in the U.S., much less the high transmission capacities that allow efficient multiplexing and make large networks feasible.

And there's the equipment problem. The demand for terminals alone will be more than the Eastern European manufacturers can hope to supply. Control Data is reportedly negotiating to help the Soviets by installing a Cybernet timesharing network for at least more experimentation, but U.S. Export Control requirements make this unlikely. In a more limited telecommunications application, IBM, Leasco/BOAC, Univac, and CDC are all bidding on a turnkey upgrade reservation system for Aeroflot. Decisions on this, however, have been delayed by the diversion of foreign currency to grain, and air traffic control systems are reportedly next in line.

All in all, then, the prospect for a vast spurt of timesharing applications in Russia are about as likely as they were here early in the 1960s. This appears to be just one more area where history, in the form of high hopes, is repeating itself.

The U.S. to the rescue?

The Soviet Union has the second largest GNP in the world, yet its relative ratio of computer utilization (value computers installed divided by GNP) is on a par with Mexico, less than Brazil. In value of computer installations, the U.S.S.R. is just slightly ahead of Canada, less than half Japan. There's no question about the Soviet Union's potential for computer growth; and if it had a free market economy, with no trade barriers, U.S. suppliers would have a heyday.

But there are problems . . . a very different socioeconomic system, political and ideological competition, the real or imaginary threat to world peace the U.S. and the U.S.S.R. fear in each other. So although significant progress in trade has been made, and EDP represents an area of tremendous export potential as the thaw increases, success depends on the answers to a number of questions:

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- To what extent will the Soviets fill their own production gap by importing computers?

- How willing is the U.S. to modify long-held views on security to help reverse its international balance of payments problem?

- Given an opening, how successful will individual U.S. companies be at negotiating contracts in an alien economic environment?

And there's a corollary question: Will the Soviets change their basic philosophy and opt for the lease/rental concept rather than outright ownership or, as is their bent, a local manufacturing capability. In the event of the latter, can software "factories" be built?

The answers will emerge. Meanwhile, CDC is hot in pursuit of Russian business . . . Honeywell is negotiating with the Soviets for what might be a turnkey production facility . . . IBM has asked permission to open a Moscow office. The head of Chase Manhattan's newly opened Moscow office sums up everyone's hopes: "The Soviet Union is the last great underdeveloped market for the U.S." It certainly is for computers.

As the data on page 2 shows, the Soviets want computers. And the evidence indicates that prospects for supplying this demand themselves are slim. But to reach the computer concentration of, say, West Germany, the U.S.S.R. right now would need $7 billion worth of computers . . . another $5 billion to match the U.S. concentration. That's big business in anybody's book, and odds are that U.S. manufacturers want their piece of this action.

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BURROUGHS EXPANDS 1700 "FAMILY" WITH EMPHASIS ON COMMUNICATIONS, EMULATION

With the recently announced fourth model of its B 1700 Series -- the B 1728 -- Burroughs introduced the hierarchial memory concept to what still may prove to be the Burroughs' product line of the 1970s (EDP/IR June 16,1972). This gives Burroughs a true virtual machine line priced roughly on a par with IBM models from System/3 up to the 370/135. The rental range for B 1700s is $1,500 a month up to $12,000 per month.

The new 1728 has a 167-nanosecond (for two bytes) memory of up to 8K bytes working in front of a slower (667 nsec. for three bytes) LSI main memory expandable from 65K to 262K in 16K byte increments. An "integrated" (required) head-per-track disk memory gives up to 40 million bytes of 20 millisec. memory.

In announcing the 1728, Burroughs emphasized that the system has an independent 16-line communications controller and two new languages that provide extensive data communications capability. The Network Definition Language permits a user to define and generate "an efficient and complete network control program for his line and terminal network;" the User Programming Language allows an experienced user to solve complex message handling problems.

Burroughs hinted that it may be going after some users of older IBM equipment as well as taking care of its own. It offers "significant conversion aids" that permit object programs of the B 300 and B 500 as well as "certain competitive computers" to be run on the 1728. What computers are they? The IBM 1401, 1440, and 1460. (Some 3,900 of these are still out there!) Maybe the original virtual computer people are going to take advantage of IBM's advertising.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" AUGUST 23,1973 • VOL.8,NO.19 P.J.McGOVERN,EDITOR

Univac settles RCA account, buys into POS -- page 7

IBM INTRODUCES SYSTEMS FOR RETAIL POS AND ON-LINE BANKING; NEW COMMUNICATION PROTOCOL GIVES USERS FULL-DUPLEX TRANSMISSION POTENTIAL

In a very real sense, the significant news was left unstated -- or at best only implied -- in the 27-page, hand-delivered press package containing IBM's August 10 announcement of systems for retail point-of-sale and on-line banking. Between the lines of the product descriptions, IBM said a lot:

- New technologies -- or at least techniques -- continue to emerge from IBM. Examples in the current offerings are a capacitance keyboard technology, gas panel displays, a revolving-disk printer (replacing the usual Selectric), and an etched stainless steel belt printer for higher-volume applications.

- A new communications standard -- called Synchronous Data Link Control (SDLC) -- now has IBM's blessing and is likely to emerge as the communications technique for the mid-1970s and beyond. Superseding IBM's binary synchronous protocol, SDLC is bit rather than character oriented . . . is "transparent," and therefore can handle any data format . . . and for the first time brings IBM users the potential data transmission cost savings inherent in full duplex operation. It will be supported only by virtual storage computers and appropriate, new controllers.

- The Autotransaction concept -- formalized earlier this year by the International Data Corporation, publisher of EDP Industry Report -- was essentially acknowledged as a legitimate growth segment of the computer industry. IBM picked AT's two "established" sectors -- retail point-of-sale and banking -- for its entry.

The two new systems come from different organizational and geographical parts of the company, and therefore illustrate the marketing orientation of IBM's full-scale entry into application-unique terminal systems. Already, a "store systems marketing organization" has been set up within the Data Processing Division for POS system sales. Regional offices in New York, Chicago, and Los Angeles will be supported from a center in Raleigh, N.C. where many system elements were designed and will be manufactured.

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IBM's entry into Autotransaction is certainly no surprise. The markets it selected have been developing for some time; IBM representation at vertical meetings -- such as the EDP conferences sponsored by the National Retail Merchants Association or the American Bankers Association -- continues to be evidence of high interest. And the advantages of an application-oriented approach have not escaped IBM management.

In a strategy memorandum introduced as evidence in the Telex/IBM lawsuit expected to be decided momentarily, the competitive advantage of this approach is cast in a clear light:

> To avoid broad exposure from great numbers of peripherals in the field, design them to fit a more limited range of applications.

What's more, the business potential for Autotransaction seems to be well understood in IBM planning circles:

> On January 19, 1971, the [Management Review Committee] reviewed long-range planning cycle adjustments, including proposals for . . . a $1.5 billion market in Consumer Transaction Systems.

Thus, the move was inevitable, offering as it does good business potential in a way that IBM seems to think will prevent across-the-board incursion by a new breed of independent peripheral manufacturers. On the other hand, the entries are late . . . providing what many people are calling a "second generation" of equipment. So for these reasons -- and to sell more mainframes -- IBM introduced total systems based on technologies new to the industry or new at least to IBM products.

Two markets . . . two systems

At first, casual glance, it would seem that IBM's two systems are quite similar; both have controllers, terminals, printers, etc. (see pages 4 and 5). So, following a valid line of reasoning, many of the elements would be based on common units, or modules. Right? Wrong! Nothing, in fact, could be further from the actual case.

Except for the use of Synchronous Data Link Control -- "IBM's efficient new transmission technique for managing telecommunications" between system controllers and a host 370 -- there just aren't any elements in common between the 3600 (banking) system and the 3650 (retail) system. Even the control units -- essentially minicomputers -- are boxes of a different breed.

This lack of commonality must be taken as one more important piece of evidence that IBM is looking at the specialized application market very much in the same way IDC has defined it with the Autotransaction concept . . . small parts of larger EDP industry segments, but the parts that will pace the growth of the information processing industry during the next decade and beyond. Companies are entering AT through a variety of different routes, and it looks as if IBM has more or less followed suit . . . recognizing the need or thrust in a couple of industry segments, and turning industry specialists loose with a bag of technical tricks to find appropriate solutions. The primary difference with IBM's approach is that there is one unifying factor -- the underlying effort to keep the systems concept and promote the use of more mainframes and more central memory for the large data bases in a transaction-oriented system.

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Enough philosophy. Some facts and a snapshot of the market environment will put IBM's latest move into a little more perspective. Then, perhaps, IBM's moves will indicate how the outlook may change.

The POS markets

One of the few areas of the computer industry that stirs up excitement today is point of sale, or POS. So whenever there is an announcement that somehow involves or promises the replacement of cash registers with computer terminals, adrenal glands start working overtime and a rash of projections breaks out across the computer-watching scene.

Unfortunately, as is usually the case in the computer industry, the situation is not simple enough for one number to be meaningful. For starters, there are three distinct types of markets for POS equipment -- and the equipment for each, as well as the companies that supply it, is different:

- General merchandise POS. This is where most of the equipment deliveries have been to date, and is the only area IBM has entered with its 3650 system. Most of the big department store chains have made large commitments, and the market is beginning to look "mature." No standards have been established. The National Retail Merchants Association has decided on a 10-digit Store Keeping Unit (SKU) code for marking merchandise, and has been working to standardize on an optical code. Now that IBM has introduced magnetics, the outlook here could change. This will probably be one of the major subjects of discussion at the next NRMA computer conference in October.

- Grocery store POS. This area is developing in a manner opposite to general merchandise. The grocers in April ended a two-year search and decided on a Universal Product Code very much like the one submitted by IBM. It's an optical code, and most manufacturers in the market say they will introduce scanners shortly. Equipment deliveries through 1972 totalled only $10 million or a little more. This year, however, shipments should approach $50 million.

- Fast food/specialty POS. This area is in its infancy, but has a potential probably as great as either of the others. In a sense, it's the least sophisticated -- aimed almost exclusively at preventing cash register errors at the thousands of limited-item counters such as those at hamburger stands. The registers must literally be idiot-proof, and might have pictures instead of numbers on the keys.

Department store dollars

There is very much a "show me" attitude in the retail industry. A certain amount of POS equipment has been installed because the store across the street did it, to be sure; but even in these cases the real reason has usually been that the store across the street did it and cut its theft losses or increased its profits. Gimmicks are great for retailers . . . when they make money.

This is probably why the retail industry, in general, is relatively undercomputerized. The Computer Installation Data File maintained by IDC indicates that all retailing accounts for only $700 million, or less than 3% of the installed base of computers in the U.S. IBM equipment accounts for about 80% of

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IBM MINDS THE STORE

IBM's 3650 retail store system combines two current products with a new controller and units specifically tailored for the retail store. It's so nearly "total" it practically puts the price tags on line with 370 host computers. The components at a glance:

3653 POINT OF SALE TERMINAL. Cash register/computer terminal that reads price tags, totals bills, and records transactions. Features independent memory and logic; communicates to higher levels for credit checks, inventory reports, etc. Purchase-only terminal costs $3,575; magnetic wand reader -- for tickets, credit cards, employee IDs -- is optional at $350.

3657 TICKET UNIT. High-speed batch encoder/printer. Prints price tags in three sizes -- one stick-on and two tie-on -- at up to 500 tags/min. Unit also encodes data on 1/4-in. matnetic stripe on ticket, doubles as batch tag reader. Purchase is $22,500, ETP is $550 per month.

3275 DISPLAY STATION, previously announced. Permits visual display communication with store controller on 1920-character CRT. Designed for administrative use, credit inquiry, inventory control from warehouse, etc. Purchase is $6,700, rental is $165 a month.

3284 PRINTER, previously announced. This 40-character/sec. matrix printer gives clean copies of data displayed on 3275's screen. Purchase is $5,590, rental is $130 a month.

3651 STORE CONTROLLER. Programmable logic unit that coordinates the system. Main memory is 40,960 bytes expandable to 57,344; an additional 5 million bytes of disk storage with fixed and movable heads is included. Controller communicates between terminals and host 370 at 2400 bits per second, and may independently handle: collection of transaction data, credit authorization, entering purchase order data, entering receipts and tag information, sales audits, and printing store management reports. Depending on the memory size, cost is $31,500 to $39,160 purchase, $700 to $870 per month on ETP.

One store controller handles up to 63 system devices on a single store loop. With optional added loops, either remote or in-store, a retailer can string a network of up to 191 devices in one local and six remote stores, all operating from one 3651 controller.

Total cost depends on size of network. IBM says "rental will be $2,697 for a store system that might include a controller, four display units, two printers, one ticket unit and one remote communications unit. The system also would include 80 point of sale terminals purchased for $286,000 and 64 magnetic wand readers purchased for $22,400. The entire system may be purchased for $412,690." Deliveries begin second quarter of 1974.

this base. An appreciation of this fact, it seems to EDP/IR, is necessary to understand IBM's latest announcement.

In all likelihood, IBM's goals for its retail system are far greater than the $400,000 or so (above) it stands to receive from the average POS installa-

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IBM WIRES THE BANKS

IBM's new banking system gathers key-entry terminals and printers around a programmable controller that operates on-line to a host System/370 over unconditioned, voicegrade telephone lines. The major components of the 3600 finance communication system are:

3604 KEYBOARD DISPLAY TERMINAL. Teller work station with silent, capacitance keyboard, programmable function keys, neon-argon gas display panel. Optional magnetic stripe reader/encoder for credit cards, ID cards, passbooks. Depending on options, purchase is $2,450 to $5,180; comparable EPT prices are $60 to $125 per month.

3610 DOCUMENT PRINTER. Prints journals, reports, forms, checks, statements, customer files. Revolving disk printer gives speeds up to 30 characters/second from a 96-character set. Data to be printed is monitored by teller or 3601 controller. Three models range from $2,800 to $4,000 purchase or $70 to $100/month ETP.

3612 PASSBOOK AND DOCUMENT PRINTER. Incorporates separate disk printer for entering transactions in passbooks or functions as a 3610 document printer. Purchase is $4,600 to $6,000; ETP runs $115 to $160/mo.

3614 CONSUMER TRANSACTION FACILITY. Electronic autoteller in lobby or through-the-wall models. Dispenses up to $400 in cash from four different kinds of accounts. Also, customers may check balances, order checks or statements, etc. 40-character gas display panel guides customers through each step of a transaction; access by customer card plus keyed-in code. $20,380 to $21,630 purchase or $545 to $580 per month ETP; through-wall installation accessories run $4,500.

3618 ADMINISTRATIVE LINE PRINTER. Handles higher volume printing of form letters, statements, etc. Characters etched on continuous stainless steel belt and print from 80 lines a minute with 96-character set up to 155 lines a minute with 48-character set. Purchase is $10,000 to $11,600; ETP runs $235 to $275 per month.

3601 COMMUNICATION CONTROLLER. Programmable link between teller terminals and central computer, also handles transactions and teller operations. FET (semiconductor) logic and memory from 8,192 to 40,960 bytes; additional storage with removable diskette. Can control and log all operations during temporary loss of communication with central computer. Purchase varies from $19,850 to $37,350, ETP between $440 and $825 a mo. Main memory increments cost $2,400 (or $50/mo.) per 8K bytes.

A "configuration for a commercial bank," -- consisting of six 3604s, a 3610, two 3612s, a lobby version of the 3614, a 3618, and a 3601 would cost $2,295 a month under ETP, sell for about $95,400. First shipments are late in 1974.

tion. Indeed, with the general merchandise POS market expected to generate no more than $100 million a year as its growth quickly approaches the demand curve for cash registers (EDP/IR Nov.6,1972), IBM will be in the uncomfortable position of committing substantial resources competing head-on in a dwindling market. Singer and NCR collectively report orders for over 100,000 terminals in

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a market that has a potential of only two or three times that amount. It just isn't like IBM to crank up its massive machinery for such a marginal opportunity for large gains.

But that isn't the whole story. To support the amount of POS activity estimated above, the nation's retailers will have to double or triple their mainframe capacity. That's where the dollar signs are; in all probability, that's the rationale behind the IBM announcement. It stands to gain from the acceptance of POS, and POS will catch on faster if IBM is endorsing it.

Money men and their dollars

The situation isn't quite the same in the banking industry, although IBM once again has followed what looks like an established trend . . . has come up with what looks like improved products for the marketplace . . . and has surrounded its offering in a systems environment. That's essentially IBM's historic approach to the computer industry. That and the introduction of some new features that stand a chance of being accepted as a de facto standard.

One of the major currents in banks' use of computers is the trend toward less paper in transactions. This necessary shift involves Electronic Funds Transfer Systems (EFTS) and will be discussed in detail in the next issue of EDP Industry Report. Coincident to this is the use of electronic "gadgetry" such as money dispensers, autotellers, and the like as marketing tools. It is to these currents that IBM is appealing with its 3600 system -- to maintain its strong position in the bank market.

Banks represent over $2 billion -- almost 8% -- of the installed base of computers in the U.S., and IBM has almost 70% of the business. This is one of the oldest and most sophisticated EDP markets, and one that is vital to IBM. It also represents the heart of the system -- coming into use sooner than many want to believe -- that may link almost all financial transfers from payrolls to purchases to leisure activity spending.

Emphasis on security

As more and more systems -- especially those containing financial and personal information -- are tied together with just such products as IBM has announced, there could be public concern about privacy and security. Almost as if anticipating this -- perhaps trying to prevent it before it happens -- IBM has carefully included "safety" features in its retail and banking systems.

- The 3614 (money machine) requires a magnetically encoded customer ID. "As a further security check," the customer must key in a personal identification number.

- The 3614 "uses an encryption/decryption feature to safeguard sensitive data during communication line transmission."

- "As a security measure, the 3601 [banking controller] can limit system access only to authorized persons." It also requires tellers to log in and recognizes them at whatever station they are working.

- The 3275 display station features a "security lock to prevent unauthorized display or modification of information."

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- And, of course, the 3653 POS terminal has a "cash and media drawer, with a removable till, that can be locked with a key."

One question that hasn't been answered, however, is how a retail store is going to prevent disgruntled customers from walking around with a magnet and playing havoc with all the price tags generated by the 3657. Retailers are certain to be asking about this.

What does it mean?

Retailers are certain to have other questions, as well. Can they really save money, using IBM's systems approach, while they pay more for the POS terminal? They as well as their banking counterparts are no-nonsense people. But one thing is certain. The concept of the application-unique terminal -- the information appliance -- has received a great boost. And there's a new computer communications concept -- SDLC -- that may well become a standard. There's certainly enough material for plenty of future analysis.

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Once burned . . ?

RCA WON'T GO IT ALONE IN POS MARKET -- UNIVAC, PLEASED WITH PAST, STEPS IN AGAIN

Although it still claims to have some interest in the computer industry, RCA has pulled its horns in yet another notch . . . and once again has found a willing buyer in Sperry Rand's Univac division, apparently pleased with its ability to transform RCA computer users into long-term Univac customers.

Admitting its unwillingness to face the competition in the embryonic point-of-sale market, RCA decided to sell its experimental supermarket checkout system to someone interested in adapting the product to recently set standards and pushing it in the marketplace. That someone turned out to be Univac, the same rescuer that stepped in to pick up the general-purpose computer pieces when RCA dealt itself out of the game in 1971 (EDP/IR Sept.29,1971).

Coincidentally -- or not -- RCA's announcement came just one week after IBM officially entered its product -- a complete system -- into the general merchandise POS marketplace . . . and only months after RCA's scanning approach lost out to one very similar to that proposed by IBM for the grocery market. Also, the RCA sale coincides closely with its decision to accept from Univac a cash settlement for what survives of RCA's general-purpose computer rental base -- cancelling the original revenue sharing plan (EDP/IR Nov.30,1971).

Still some terminal interest

Following these announcements, it looked as if RCA -- only three years after its chairman made public his dream of taking a place in the computer industry second only to IBM -- was preparing to make a final, clean break with the computer business. But RCA simply won't give up; its executives are quick to point out that the company is still very much interested in the terminal market and continues to build special application computers for the military. As if to underscore the point, RCA planned to unveil a line of special-purpose microprocessing terminals -- for use by police, etc. -- this week.

So, why the decision to bow out of POS? As RCA explains it, one big worry was the fact that RCA no longer has a line of general-purpose computers to sell

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in tandem with a POS system. Granted most of the important POS manufacturers today aren't in the mainframe business either, but RCA apparently believes a total systems package will be more competitive as the market develops. Thus, its argument goes, solitary terminal and minicomputer manufacturers may be squeezed out.

At any rate, RCA probably isn't anxious to go another round against IBM . . . and whatever enthusiasm it may have felt for its supermarket system may have been dampened by the nation's grocers. Their Universal Product Code is so similar to IBM's proposed entry that the wrong one was inadvertently distributed at the press announcement in April.

Buying into POS . . .

Univac, a novice in the field, took over RCA's system, its rights, and some RCA personnel with its "instant technology" purchase for "less than $5 million." It says that RCA's system will be adapted to the Universal Product Code and offered to supermarkets in two versions:

+ as a semi-automatic key-entry system;

+ as a fully automatic model equipped with a laser scanner that does everything but bag the groceries.

Anticipating that most customers will want to step up the sophistication of their systems at a gradual pace, Univac does not expect to sell many total systems -- incorporating Univac mainframes -- for chain-wide inventory control in the near future. But . . . that seems to be the direction things will take.

. . . after success with RCA computer users

Meanwhile, Univac and RCA have decided on a "mutually advantageous" cash settlement that will close the books on Univac's purchase of RCA's rental base. Citing the cumbersome "complexity" of the 1971 revenue sharing arrangement, the two companies agreed on a total price of $127 million as the sales value of RCA's $520 million (original price) rental base. Between the downpayment and shared revenues to date, Univac has already paid RCA $90.3 million; it will pay the remaining $36.7 million in three installments over the next two years.

The final figure is close to the maximum RCA thought it might collect under the original contingency contract; thus, it comes as somewhat a boon to RCA . . . and must be considered a tribute to Univac. With nearly one-third of RCA's computers operating alongside IBM equipment at the time of the sale, Univac's chances of keeping RCA's foothold did not look strong. But, almost miraculously, Univac reports it has kept 90% of RCA's customers and is upgrading substantial numbers of them to Univac equipment. This is one of the subjects EDP/IR will be examining carefully in its next Computer Loyalty Study, scheduled for publication during September.

IN ANOTHER ACQUISITION MOVE, Univac reported August 17 that it had completed the purchase of Information Storage Systems (ISS) from Itel. Terms: $23 million to Itel initially, plus more cash "contingent upon, among other things, sales to customers other than Sperry during the balance of 1973 and the full calendar years of 1974 and 1975." ISS will "continue developing and manufacturing" its products -- including IBM plug-compatible disk drives -- for Itel and "a wide range of other customers." Thus, Univac gets closer to some IBM accounts.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" AUGUST 30,1973 • VOL.8,NO.20 P.J.McGOVERN,EDITOR

ELECTRONIC FUNDS TRANSFER STARTS TO INVADE THE POINT OF SALE AS BANKERS DISCOVER THERE'S MORE THAN ONE WAY TO ELIMINATE CHECKS

"The checkless-cashless society" -- yesterday's buzzword in banking -- has been replaced by "EFTS" -- today's acronym for Electronic Funds Transfer System. The switch in names suits the "evolutionary, not revolutionary" approach the banking and thrift industries have taken to alter the way money changes hands. But the pace of evolution has quickened, and EFTS now faces its biggest challenge -- to automate exchange at the retail point of sale.

IBM gave EFTS its most recent boost by adopting magnetic scanning in its new retail system (detailed in the last issue of EDP/IR). The technology compatible with cash- and credit-card reading won out over punched tickets (the retailers' traditional stock controller) and optical scanning (despite IBM's experience with the grocery industry's optical symbol). A "mag stripe" standard for retailing means that no new scanning equipment is needed to read credit cards -- the key to automatic funds transfer at the point of sale.

But even before IBM's semi-official recognition of the concept, EFTS systems illustrating the "evolutionary," less-than-total systems approach were gaining in acceptance. And even large experiments showed good results.

- Automated teller units are booming, even though their use is still restricted in most states to bank premises. The machines range from simple cash dispensers to "full service" units that accept deposits, permit transfers among accounts, and accept bill payments. Over 1600 have been installed in the U.S., with half again as many on-order.

- The two major bank cards, Master Charge and BankAmericard, launched nationwide automatic verification networks last spring. At present the systems chiefly speed up phoned credit inquiries, but they will eventually support a network of specialized credit verification terminals -- which could also transfer funds automatically.

- Full-blown point-of-sale funds transfer experiments have produced favorable results in a Columbus, Ohio suburb and on Long Island. The economic feasibility of electronic funds transfer has also been demonstrated by a large scale study in Atlanta. However, the legal issues, notably anti-trust considerations, are preventing implementation of an operational experiment.

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Alongside the major, industry-wide developments related to funds transfer, individual banks and thrifts -- savings banks, savings and loan associations, and credit unions -- are taking smaller, but significant, steps to reduce the number of checks in transactions. In some cases, smaller institutions have taken the lead with innovations like automated tellers, compensating for lack of size with joint ventures or a service bureau approach.

Thus the interest in EFTS in retail banking is broad-based. It's another illustration of the concept of Autotransaction developed by the International Data Corporation, publisher of EDP Industry Report. In fact, the strong support of EFTS-related hardware and services among financial institutions is one of the reasons AT can expect tremendous growth in this decade.

EFTS -- Atlanta Style

The Atlanta Payments Project is an ambitious program sponsored by 5 leading Atlanta banks to implement the full EFTS package -- from electronic deposit of paychecks and automatic debit of utility bills to funds transfer in retail stores. The point-of-sale phase of the project has not left the feasibility study stage, but the study has been quite comprehensive and has received more notice than the operational experiments of the Hempstead Bank on Long Island and City National in Upper Arlington, Ohio. It describes the state of the art in point-of-sale EFT.

As originally conceived, the POS system had 3 goals: (1) Check verification at the point of sale (2) Authorization and capture of data from credit card and bank card transactions (3) Communication of debits and credits directly from the point of sale to banks, eliminating the paper check. The last step would entail a switching and processing center (SPC) to clear transactions.

In the Atlanta scenario for EFTS (see diagram), the customer might present a credit card to the sales clerk. The clerk inserts the card into a terminal at the counter and keys in sales data. The terminal relays the data to the SPC, and the SPC routes it to the customer's bank. The bank relays authorization through the SPC to the terminal. If the transaction is approved, the SPC also relays a credit to the merchant's bank. At month's end, the customer receives a checking account statement with descriptive entries recording his transactions.

For a check transaction, the terminal would relay the verification request through the SPC to the customer's bank. In the case of an out-of-town customer using a national bank card, the SPC would switch the data to the local Master Charge or BankAmericard processing bank for authorization only, by means of the new national authorization networks, Inas and Base respectively.

A good 5¢ credit authorization?

To determine the feasibility of their proposal, the Atlanta project interviewed merchants to see what they would pay for such a service. For check verification, a suggested $55 per month plus 10¢ per transaction was favorably received. The automatic transfer services were generally approved, and many merchants saw the cash card as the long term solution to bad check problems.

The next step was a cost estimate of a minimum and a substantial development program -- the former to put 15% of POS checks and 40% of POS card transactions in the system by 1983, the latter to put 40% of the check transactions and 80% of the card transactions on the system. Each program implied a differ-

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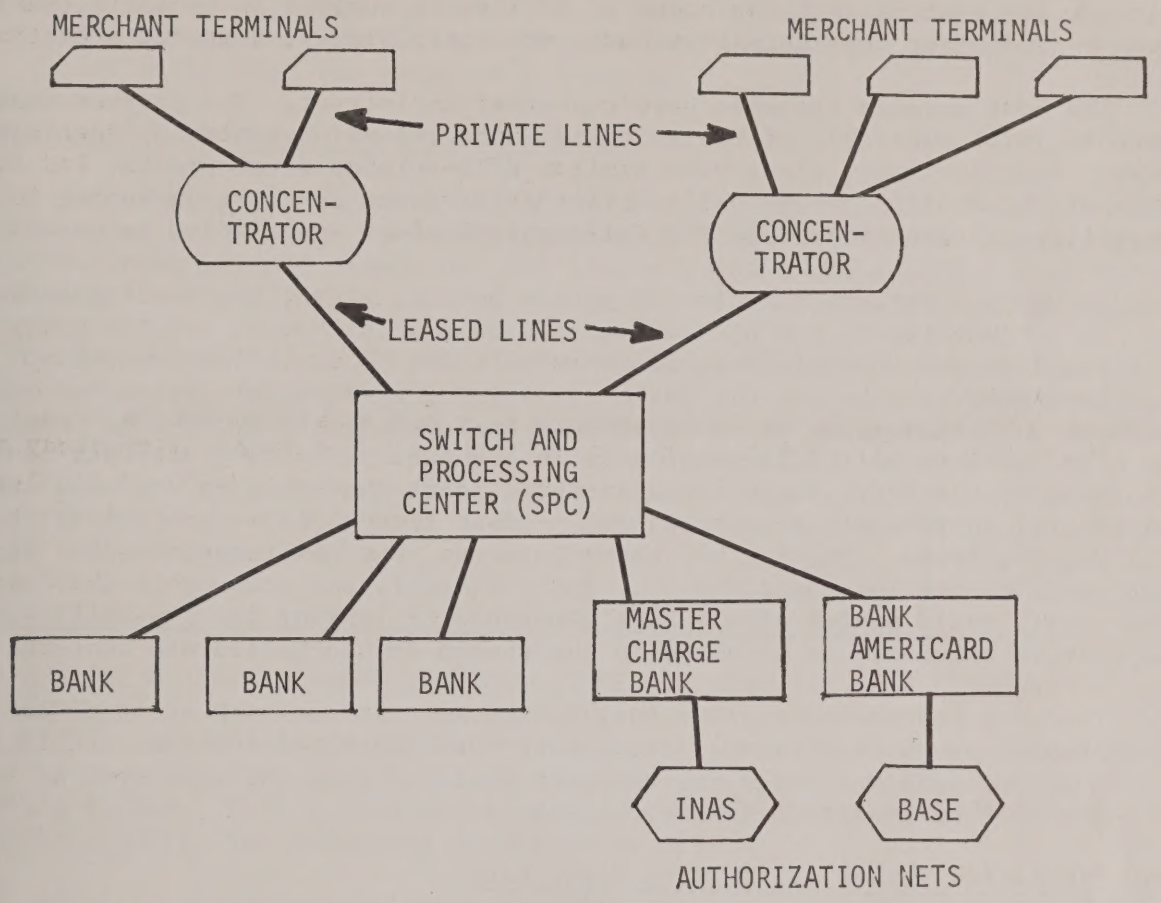
HOW EFTS MIGHT LOOK -- THE ATLANTA PLAN



This is how the Atlanta Payments Project pictured an operational electronic funds transfer system. See text for a description of transactions. To cut communications costs, private wiring and message concentrators were recommended wherever wires would not cross public thoroughfares (e.g. in shopping centers). The terminals would be owned by the merchants or by individual banks, while the SPC would be jointly owned by sponsoring banks.

But this is not the last word. The Justice Department has already objected to the jointly-owned SPC, and thrift institutions want to be included among the boxes labelled "Bank." And some provision will have to be made to interchange with other SPCs -- a function that the automated authorization networks, Inas and Base, could perform, at least for bank card holders.

ent set of costs and revenues. Costs considered were terminals, SPC operations, magnetic strips, SPC hardware, communications costs, and bank-related costs.

At the projected costs, the minimum plan would not work, since it required an unacceptable 10-20¢ per transaction to survive. The substantial development plan, on the other hand, produced acceptable revenues at 6¢ for a check transaction and 10¢ for a card transaction. Even at 5¢ flat for all transactions, the second plan projected a profit. EFTS could work; in fact, it could fly!

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Who will own the switch?

The Atlanta Payments Project study reconfirmed what had been suspected all along -- that EFTS at the point of sale is economically viable with current technology. But systems with the scope of EFTS don't survive on economic feasibility alone -- and other considerations have, not surprisingly, demanded attention.

The most notable troubles have concerned anti-trust. The project team recommended joint ownership of the switching and processing center by participating banks. That proposal, along with similar EFTS-related developments, led Donald Baker of the Justice Department's Antitrust Division to start jawboning for more competitive alternatives. To the California Bankers Association he noted:

> We would never, as a matter of public policy, permit the leading banks in a community to put up new branches on a joint basis, yet the money machines and the point-of-sale terminals are in truth the branches of tomorrow.

The comments left EFTS proponents in a quandary, seeking alternatives for ownership of the SPC. Suggestions included joint ownership in an arm's length subsidiary, third-party ownership, and -- most frequently -- control by the Federal Reserve Banks. The Fed has shown interest, but hesitates to offer services that could be offered commercially. Baker himself, and presumably the Justice Department, would prefer single-bank ownership -- leaving the possibility of a competitive service. As he noted in the speech to the California bankers:

> It seems increasingly clear that the larger metropolitan areas of the country can support several competing terminal-based systems. Public policy should encourage the competitive development of such systems -- rather than single local monopolies.

EFTS liberation fronts ... Thrifts fight back

While the large commercial banks have been engaging in the more visible POS controversies, the opposition has not been napping, but most of the EFTS projects of thrifts and smaller banks have involved automated tellers, not POS systems. Autotellers are hardly crucial to EFTS (see below); still, the projects make the point that their sponsors are on top of the technology -- and will be able to participate in point-of-sale EFTS when it comes.

For savings banks, savings and loans, and credit unions, EFTS could be a liberator; effectively allowing them to offer checking-type services. But the thrift industry also fears that commercial banks will control EFTS to their detriment -- apprehensions confirmed by proposals of bank-owned SPCs. So thrifts have started to bind together in "self defense" -- sometimes aggressively.

- The Mutual Institutions National Transfer System (Mints), an arm of the mutual banks' national association, already franchises a "cash card" system to its members, supplying the cards as well as the system package. Recently it announced a program to purchase automated tellers and other transaction hardware to add to the franchise package.

- The Savings and Loan League, traditionally a fierce competitor of commercial banks, is taking the same route as the mutuals. A sub-

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sidiary franchises the "Transmatic" system, which now includes a cash card, called "Prestige," for eventual use with POS terminals and automatic tellers.

- Even the credit union association is said to be developing a franchise system through its data processing subsidiary. It may contract with Mints for terminal purchases.

... and small banks organize service bureaus

As far as competition goes, small banks are in much the same position as the thrifts -- but without the industry organization that would make a wide-scale mutual development project feasible. Two companies at opposite corners of Ohio may be pointing the way for this part of the banking industry -- to service bureaus.

The companies, Financial Computer Services and Ohio Valley Data Control, in Fremont and Belpre respectively, currently offer on-line cash dispenser services to a total of eight banks in Ohio and West Virginia -- among the first on-line units in either state! The president of FCS is organizing other small service bureaus to trade software and ideas. Of course, the service bureau approach is suited to POS, too, since it can avoid the anti-trust issue. It could be the wave of the future.

(continued on page 8)

THE MAJORITY-OF-ONE OPINION -- THE "TERMINAL" IS A "TELEPHONE"

One of the most interesting point-of-sale experiments will be conducted this fall in the Cleveland area by Bancsystems Association, a Master Charge processing center. It's a very small test, but it will feature 30 "prototype" credit authorization terminals developed by AT&T.

Actually, two types of terminals will be used. One requires only that a clerk insert the card. A memory unit retrieves the authorization center number and dials it. In the meantime, the clerk can be entering sales data via the touchtone pad on the device. On connection, the data is fed to the center and a voice response provides verification. The other unit requires the insertion of a merchant identification card as well as the credit card.

Bancsystems chose to test the terminals to see whether automatic dialup would be cheaper than leased line service. But clearly there is more at issue. The phone company is careful to point out that the "terminal" is only a modified telephone -- even wanted Bancsystems to adopt a punched-hole card a la current automatic dialup phones. Still, such a device might logically replace the SPC of most bankers' EFTS plans.

If, for example, the memory of the phone were large enough, or if the customer and merchant cards included bank telephone numbers -- a funds transfer could be accomplished without an independent switching center.

Of course, the system would have drawbacks -- notably a lack of security (but how secure are other EFTS plans?) and the uproar that a major AT&T push into another "marginally related" field would raise. Nevertheless, the prospect shows that the possibilities inherent in EFTS have not been exhausted.

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GENERAL PURPOSE COMPUTER CENSUS

Counts in the General Purpose Digital Computer (Group A) Census, shown below, are based on the best information available to the International Data Corporation, but are estimates. Computer manufacturers, as a rule, do not directly supply this type of information, and it is only through the use of IDC's extensive data files and other information sources that such estimates are possible. The computers included in Group A comprise the bulk of digital computers (by value) in operation. They are byte or character oriented -- with the exception of large-scale scientific machines -- and are primarily programmed with higher-level languages. In addition to this Census, EDP/IR publishes a Dedicated Application Digital Computer (Group B) Census that includes minicomputers and specialized-purpose machines.

AS OF JULY 1, 1973

NAME OF MANUFACTURER	COMPUTER MODEL	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Burroughs	B-200 Series	$ 5,600	11/61	125	81	206	X
	B-300 Series	$ 5,200	7/65	415	65	480	X
	B-500	$ 6,000	11/68	480	450	930	X
	B-705	$ 1,200	3/73	20	10	30	NA
	B-711	$ 1,400	3/73	15	5	20	NA
	B-1712	$ 1,950	8/72	65	30	95	115
	B-1714	$ 2,200	8/72	90	35	125	150
	B-1726	$ 5,300	2/73	50	20	70	130
	B-1728	$ 7,700	8/73	-	-	-	NA
	B-2500	$ 8,200	2/67	270	122	392	X
	B-2700	$ 8,700	8/72	38	17	55	65
	B-3500	$ 14,700	5/67	580	360	940	30
	B-3700	$ 21,000	11/72	25	8	33	60
	B-45/4700	$ 27,000	10/71	80	30	110	60
	B-5500	$ 35,000	3/63	95	33	128	X
	B-5700	$ 29,500	12/70	20	6	26	10
	B-65/6700	$ 50,000	11/69	49	43	92	14
	B-7700	$120,000	2/72	1	0	1	3
	Subtotal			2,418	1,315	3,733	637
Control Data Corp.	C-20	$ 19,600	4/61	3	7	10	X
	1604/A/B	$ 42,000	1/60	19	5	24	X
	31/3150	$ 9,000	12/64	90	50	140	X
	3170	$ 17,500	12/70	14	9	23	X
	3200	$ 14,700	5/64	53	45	98	X
	3300	$ 28,800	9/65	108	93	201	X
	3400	$ 23,700	11/64	5	10	15	X
	3500	$ 26,000	1/69	10	15	25	X
	3600	$ 48,000	6/63	20	15	35	X
	3800	$ 53,000	12/65	23	4	27	X
	6200	$ 39,000	11/70	2	6	8	X
	Cyber-72	$ 32,900	10/71	9	17	26	11
	6400	$ 54,000	5/66	60	48	108	X
	Cyber-73	$ 47,000	3/72	7	13	20	12
	6500	$ 68,000	12/67	18	12	30	X
	6600	$115,000	8/64	60	33	93	X
	Cyber-74	$105,000	3/72	2	5	7	4
	6700	$125,000	7/70	2	1	3	X
	7600	$165,000	1/69	11	6	17	X
	Cyber-76	$165,000	3/72	1	2	3	2
	Star-100	$250,000	8/73	-	-	-	3
	Subtotal			517	396	913	32
Digital Equipment Corp.	PDP-6	$ 10,000	10/64	16	9	25	X
	1040/1050	$ 13,300	10/67	165	68	233	15
	1055	$ 22,000	12/71	17	6	23	11
	1070/1077	$ 30,000	6/72	8	2	10	7
	Subtotal			206	85	291	33
Honeywell Information Systems	Gamma 10	$ 2,500	7/64	0	935	935	X
	G-5X Series	$ 1,550	1/66	330	2,570	2,900	100
	G-100 Series	$ 4,000	4/66	340	1,480	1,820	X
	G-200 Series	$ 13,700	4/61	220	68	288	X
	G-405/410	$ 9,000	2/68	16	7	23	X
	G-415/420	$ 14,000	5/64	155	195	350	X
	G-425/430	$ 17,000	6/64	50	105	155	X
	G-435/440	$ 22,000	9/65	80	50	130	X
	G-615	$ 55,000	6/69	8	22	30	X
	G-625	$ 65,000	4/65	2	3	5	X
	G-635	$ 80,000	5/65	55	15	70	X
	G-645	$120,000	7/66	3	1	4	X
	G-6025	$ 21,800	11/73	-	-	-	30
	G-6030/40	$ 33,000	6/71	46	60	106	64
	G-6050/60	$ 46,500	7/71	34	26	60	46
	G-6070/80	$ 61,500	7/71	11	5	16	16
	G-6180	$100,000	2/74	-	-	-	5
	G-Subtotal			1,350	5,542	6,892	261
	H-105	$ 2,500	11/71	490	130	620	195
	H-110	$ 2,600	9/68	190	285	475	X
	H-115	$ 5,300	3/70	1,000	410	1,410	145
	H-120	$ 4,600	1/66	410	200	610	X
	H-125	$ 7,900	12/67	100	300	400	X
	H-200	$ 6,400	3/64	500	245	745	X
	H-2020	$ 2,350	2/73	85	10	95	150
	H-2030	$ 5,050	1/73	15	5	20	30
	H-2040	$ 9,000	4/72	170	50	220	95
	H-1015	$ 12,500	4/71	105	60	165	28
	H-2050	$ 14,100	4/72	90	32	122	70
	H-12/1250	$ 12,000	2/66	330	160	490	X
	H-2015	$ 17,800	2/71	115	45	160	X
	H-2060	$ 18,500	4/72	50	8	58	37
	H-2200	$ 19,600	1/66	125	55	180	X
	H-2070	$ 23,000	5/72	27	3	30	20
	H-3200	$ 26,900	2/70	68	39	107	10
	H-4200	$ 31,000	9/68	30	5	35	X
	H-2088	$ 44,000	4/72	5	1	6	4
	H-8200	$ 73,000	2/69	22	5	27	X
	H-4/1400	$ 13,200	12/61	34	24	58	X
	H-800	$ 28,500	12/60	39	12	51	X
	H-1800	$ 46,000	7/64	7	4	11	X
	H-Subtotal			4,007	2,088	6,095	781
	HIS-Subtotal			5,357	7,630	12,987	1,042

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AS OF JULY 1, 1973

NAME OF MANUFACTURER	COMPUTER MODEL	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
IBM	System 3/6	$ 1,530	12/70	2,100	1,700	3,800	900
	3/10	$ 2,200	1/70	11,900	5,300	17,200	2,900
	3/15	$ 4,550	2/74	-	-	-	NA
	360/20	$ 3,700	12/65	4,400	5,000	9,400	X
	360/22	$ 5,800	7/71	1,305	320	1,625	205
	370/115	$ 6,650	2/74	-	-	-	NA
	360/25	$ 7,500	10/68	1,030	1,280	2,310	X
	370/125	$ 9,800	6/73	50	15	65	2,900
	360/30	$ 11,000	6/65	3,305	2,600	5,905	X
	370/135	$ 14,600	5/72	1,600	700	2,300	2,000
	360/44	$ 14,300	7/66	70	88	158	X
	360/40	$ 19,600	6/65	1,790	1,900	3,690	X
	370/145	$ 24,700	7/71	1,550	650	2,200	1,100
	360/50	$ 32,100	8/65	730	595	1,325	X
	370/155	$ 51,700	2/71	1,150	500	1,650	X
	370/158	$ 59,200	5/73	27	12	39	725
	360/65	$ 69,000	11/65	480	225	705	X
	370/165	$ 89,800	6/71	205	57	262	X
	370/168	$115,500	7/73	-	-	-	160
	360/67	$112,000	6/66	42	13	55	X
	360/75	$ 94,000	1/66	34	15	49	X
	360/85	$141,000	10/69	5	5	10	X
	360/9X	$150,000	11/67	11	3	14	X
	360/195	$188,000	3/71	15	4	19	X
	370/195	$192,000	5/73	1	0	1	13
	1130	$ 2,300	2/66	3,870	2,040	5,910	X
	1401	$ 3,700	9/60	1,150	1,150	2,300	X
	1401-G	$ 2,300	5/64	65	40	105	X
	1401-H	$ 1,300	6/67	50	52	102	X
	1410	$ 17,000	11/61	115	60	175	X
	1440	$ 4,700	4/63	290	315	605	X
	1460	$ 9,800	10/63	65	47	112	X
	1620	$ 2,700	9/60	350	200	550	X
	7010	$ 26,000	10/63	14	9	23	X
	7030	$160,000	5/61	4	1	5	X
	704	$ 32,000	12/55	1	1	2	X
	7040	$ 25,000	6/63	9	17	26	X
	7044	$ 36,500	6/63	9	11	20	X
	705	$ 38,000	1/56	5	3	8	X
	7070-74	$ 27,000	3/60	113	40	153	X
	7080	$ 60,000	8/61	51	1	52	X
	7090/94	$ 70,500	8/60	87	16	103	X
	Subtotal			38,048	24,985	63,033	10,903
NCR	Century-50	$ 1,950	2/71	800	45	845	180
	Century-100	$ 2,980	9/68	1,150	815	1,965	X
	Century-101	$ 2,750	10/72	200	0	200	150
	Century-200	$ 7,900	9/69	620	345	965	125
	Century-251	$ 10,000	11/73	-	-	-	
	Century-300	$ 20,000	2/72	12	13	25	20
	304	$ 10,000	1/60	9	0	9	X
	310	$ 1,000	5/61	16	9	25	X
	315	$ 5,000	5/62	330	325	655	X
	315-RMC	$ 11,800	9/65	56	48	104	X
	390	$ 800	5/61	250	145	395	X
	500	$ 1,100	10/65	800	1,600	2,400	X
	Subtotal			4,243	3,345	7,588	475
Philco	1000	$ 7,000	6/63	15	1	16	X
	210/211	$ 40,000	10/58	11	1	12	X
	212	$ 52,000	1/63	6	1	7	X
Singer	System 10	$ 2,500	10/70	750	550	1,300	400
Standard Computer	IC-4000	$ 9,000	9/68	5	0	5	X
Corp.	IC-6000	$ 16,000	5/67	4	0	4	X
	IC-7000	$ 17,000	6/69	6	0	6	X
Univac	I/II	$ 25,000	3/51	2	4	6	X
	III	$ 25,400	8/62	42	41	83	X
	SS-80/90	$ 8,000	8/58	28	28	56	X
	418-I/II	$ 13,700	6/63	80	62	142	X
	418-III	$ 19,600	7/69	45	63	108	8
	491/492	$ 27,000	12/61	13	12	25	X
	494	$ 41,400	2/66	52	38	90	X
	1004	$ 1,000	2/63	920	950	1,870	X
	1005	$ 1,630	4/66	725	170	895	X
	1050	$ 8,800	9/63	185	140	325	X
	1103/5	$ 35,000	12/50	0	3	3	X
	1106	$ 40,000	12/69	60	74	134	36
	1107	$ 57,000	10/62	8	15	23	X
	1108	$ 68,000	9/65	150	100	250	6
	1110	$ 79,000	6/72	5	16	21	20
	9200	$ 2,300	6/67	1,560	910	2,470	30
	9300	$ 4,050	9/67	870	900	1,770	50
	9400	$ 11,600	5/69	250	250	500	60
	9700	$ 21,000	8/72	15	8	23	21
	Larc	$135,000	5/60	1	0	1	X
	Subtotal			5,011	3,784	8,795	231
	301	$ 6,600	10/60	184	13	197	X
	501	$ 16,100	6/59	19	1	20	X
	601	$ 40,900	11/62	2	0	2	X
	3301	$ 22,700	7/64	65	0	65	X
	Spectra 70/15	$ 4,000	9/65	15	0	15	X
	Spectra 70/25	$ 7,000	9/65	1	1	2	X
	Spectra 70/35	$ 11,800	1/67	115	6	121	X
	Spectra 70/45	$ 22,600	11/65	286	22	308	X
	Spectra 70/46	$ 37,400	11/68	40	2	42	X
	Spectra 70/55	$ 34,900	11/68	6	3	9	X
	Spectra 70/60	$ 40,500	9/70	18	0	18	X
	Spectra 70/61	$ 47,200	3/71	14	0	14	X
	Spectra 1600	$ 3,600	1/69	67	0	67	7
	Spectra 70/2	$ 11,500	7/71	125	0	125	X
	Spectra 70/3	$ 18,900	10/71	10	0	10	X
	Spectra 70/6	$ 29,300	10/71	39	0	39	X
	Spectra 70/7	$ 36,300	10/71	18	0	18	X
	Subtotal			1,024	48	1,072	7
	Totals			6,035	3,832	9,867	238
Xerox	Sigma-5	$ 11,500	8/67	114	31	145	X
	Sigma-6	$ 20,000	11/70	26	3	29	5
	Sigma-6E	$ 6,100					
	Sigma-7	$ 24,000	12/66	71	22	93	X
	Sigma-8	$ 19,000	9/71	4	5	9	2
	Sigma-9	$ 44,000	11/71	16	7	23	7
	530	$ 4,500	8/73	-	-	-	NA
	940	$ 24,000	4/66	60	2	62	X
	9300	$ 8,500	11/64	34	7	41	X
	Subtotal			325	77	402	14
	TOTALS			57,946	42,218	100,164	13,774

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Autotellers -- the side show

The booming automated teller/cash dispenser market provides the comic relief in the EFTS debate. Bankers are not sure what to make of these gadgets, all of which dispense cash and may accept deposits, transfer funds from one account to another and accept bill payments, as well. They are still relatively untested, but one thing is certain; if one bank or (worse) S&L in town gets one, everybody is ready to follow suit.

The price of the machines is nothing to laugh about -- $18,000 for the bare minimum to $40,000 -- installation, promotion, and maintenance costs could run to over $15,000 in the first year of operation, and $10,000 or more thereafter. But they're selling. About 1600 have been installed to date, with about half again that figure on order. The installed base should reach 2000 by yearend and should double in 1974, especially as thrift institutions start buying through the Mints and Transmatic programs.

Why the interest? Novelty, to be sure, but at the price that alone would make few sales. More likely it's marketing -- by the manufacturers to the banks and by banks to their customers.

+ There are already 10 manufacturers in the field and more are coming. The leader is Docutel, with over 1000 of the installed machines. The Money Machine, Inc., which markets a cash dispenser from Japan, is next. Other entrants include Burroughs and IBM (soon to be joined by NCR), bank equipment suppliers Mosler and Diebold, and a handful of others such as Bank Computer Network and Digital Security Systems. That's a lot of salesmen promoting the concept to the industry.

+ Autotellers fit into a lot of banks' marketing plans -- some have made them the focal point of "packaged" services. The machines are also an alternative to longer hours -- and substitute for full-fledged branches in some cases.

The real market for autotellers -- near the point-of-sale in grocery stores, shopping malls, and airports -- is still closed by branching laws in most states. When that barrier is breached, the problem of shared facilities -- anti-trust -- remains to be solved, perhaps by adopting the service bureau approach.

When autotellers finally enter the retail marketplace, they will be competing with other point-of-sale systems -- for instance, automated check-verification services. National Transactions Network will install 500 customer-operated terminals in Florida grocery stores this fall. The service verifies checks through the terminal -- and indemnifies store and bank in the case of defaults or frauds. Grocers might find this an attractive alternative to a lineup of cash dispensers along their walls.

Thus, autotellers are of dubious significance in the overall evolution of funds transfer. Like any "interim" solution, they are bound to remain for quite awhile. Whether they thrive depends on how customers react, how soon and how far point-of-sale EFTS spreads, and how successful competing services are.

The real significance of the autoteller "fad" is that it cuts across financial industry lines. Small institutions aren't waiting for massive automation "projects," and are bringing EFTS to reality -- piece by piece -- on their own.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" SEPTEMBER 13,1973 • VOL.8,NO.21 P.J.McGOVERN,EDITOR

360 "scraps" make good pickings -- page 4

CONTROL DATA AND NCR POOL DEVELOPMENT EFFORTS FOR NEW COMPUTER FAMILY, DROP "SWINGER," SUGGEST TRUE UNBUNDLING OF REAL SOFTWARE COSTS

When Control Data and NCR decided to pool much of their computer peripheral manufacturing capabilities into Computer Peripherals Inc. and to begin "a broad cooperative program designed to expand each company's future role in the general-purpose computer industry," they hurriedly called large briefing sessions for both the press and the financial community. Talk of imminent merger was rampant . . . but the two quietly went about forming the company that this year is expected to ship $100 million worth of equipment to the two owners.

Now, the two companies have decided to continue the "broad cooperative program." Indeed, the recent announcement of the CDC-NCR Advanced Systems Laboratory (ASL) "to conduct joint architectural design of future computer central processing units" has implications far more vast than the jointly owned peripheral company. Yet, the announcement was made quietly and the two companies were able to make a much more believable statement that the action "does not change our previously announced policy to maintain separate identities in the EDP market. Merger is not contemplated now or later." Elements of the plan involve:

- Two physical laboratories, one near each of the companies' EDP manufacturing center but headed by a person from the other company;
- No "swing" processor, which NCR was to have developed under the cooperative plan as it was originally announced;
- The possibility of truly separate pricing for all software, including operating systems. Such an approach could be one of the most radical pricing moves in the history of the computer industry.

Marketing of the new computer family, according to current plans at CDC and NCR, will be completely separate. Indeed, the two companies don't really compete, and probably won't. The benefits of the joint effort will be to conserve R&D dollars and perhaps to save each other by giving customers a full computer line that is an alternative to Fortress IBM. It seems to be much in the same spirit -- and probably stems from the same decision -- in which NCR joined with CDC, ICL, and CII in Multinational Data S.A. to work toward standards.

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In this effort, Multinational Data hopes to facilitate the development of internationally compatible products within the computer industry. Created in May, 1971, it "starts from existing national and international standards and extends the scope into new areas or into areas which have been left as options for national or user standardization." Activities cover software, hardware, and systems aspects of EDP products.

New labs . . . few product details

The new CDC/NCR laboratory will actually exist in two locations -- one near CDC's present development facility in the Minneapolis area, one near NCR's DP operation in San Diego. Funding will be on a 50-50 basis, and little is being said other than that the laboratory will conduct joint architectural design of future computer central processing units.

"For proprietary reasons," the two companies reported in the joint press release announcing ASL, "detailed architectural plans for the two companies' future systems are not being disclosed at this time. The architecture does, however, include significant compatibility accommodations for current users of both companies' systems." The staff of the laboratory is expected to reach about 100, taken primarily from the two companies and split equally between the two locations.

No more swinger

At the time NCR and CDC established Computer Peripherals Inc., they signed a mainframe cooperative agreement that talked of a "swing" processor, a product to bridge the two companies' future computer lines. NCR would develop and produce the lower and medium-sized portion of the line -- including the swing processor that would operate in three modes; CDC would develop and produce the more powerful processors. This concept now changes slightly in terms of development, even though it may be closely followed in practice.

Anticipating questions about this, CDC had prepared answers to potential questions about the new plan. It said:

> In the period of time since the original announcement, a joint engineering team has been working to determine the most efficient method of achieving a common product line. As the result of this effort we have determined that developments in hardware and, more importantly, operating systems technology will permit the necessary migration capability without the separate development of a swing processor.
>
> The concept has only changed with regard to the utilization of the swing processor to achieve compatibility. NCR will still develop and produce the lower and medium-sized systems and CDC will develop the more powerful processors with each company having access to the other's processors through an OEM arrangement. The concept of the swing processor has evolved to one of software rather than hardware as a result of the studies conducted over the past year.

So even though there has already been some agreement between the companies, and even though the ASL officially began operation on Sept. 1, 1973, the message is clear: No major new mainframe product can be expected from CDC or NCR until 1977 at the earliest. Development of a new product line simply takes at least three or four years, even when much advance planning has been done.

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GENERAL-PURPOSE COMPUTER MARKET, WORLDWIDE, BY SIZE CLASS
(Yearend 1972 Numbers for U.S.-Based Manufacturers; Copyright 1973 by IDC)

Size Class (Rental Range)	Total Installed Value	%	Number	%	Market Share (#): CDC	NCR	If +
Small (Less than $2,500)	$ 2,952M	7%	32,871	33%	-	10.3%	10.3%
Medium ($5,000 to $10,000)	8,171M	19%	38,526	39%	0.4%	10.7%	11.1%
Large ($10,000 to $40,000)	19,239M	46%	23,622	24%	1.7%	0.6%	2.3%
X-Large (More than $40,000)	11,699M	28%	3,914	4%	9.2%	-	9.2%
TOTALS	$42,061M	100%	98,933	100%	0.9%	7.8%	8.7%

THE GLOVE-LIKE FIT in Control Data and NCR product offerings is dramatized in the table above . . . as is their need for a product in the "Large" category, exactly where the old "swing" processor would fit. NCR is extremely strong in the smallest price category (below $1,250 per month) and holds its 10% share throughout the Medium field. Actually, with the growth sure to occur while a new family of computers is being designed, the 10% level among Large computers might not be too difficult to attain. This would help pull the value of CDC's and NCR's installed bases (which stand at 3.8% and 2.6% respectively) up to the 10% level . . . the more-or-less magical market share that many observers think is necessary for a computer manufacturing operation to endure.

New pricing structure

At the ACM conference held in Atlanta late in August, CDC announced a new multi-mode software operating system, part of Kronos, for its Cyber 70 product line and Cybernet service network. But tucked into the general discussion by CDC marketing VP James Murdakes was the statement of CDC's intention to change its pricing policies in the future.

> Control Data intends to unbundle software from the hardware price as fully as possible for new hardware product lines. The total price of a typical system will remain competitive but the percentages of the total price that are for hardware and for software will more accurately reflect their true value.

Such an approach, CDC says, will improve competition: "Software, with rare exception, is a subsidized undertaking. Subsidization limits competition. Limited competition hurts buyer and seller alike. Control Data is dedicated to reversing this situation."

Indicative of CDC's commitment to software -- for new services as well as for a new product line -- Murdakes reported that almost 60% of the company's R&D is expended on software development . . . and that this ratio will continue to prevail. Thus, we have a hint at the pricing structure that can be expected when the new computer family from the CDC-NCR lab is introduced several years hence. And CDC executives are pondering industry reaction to such a move. Would it be acceptable to other manufacturers, they wonder? EDP/IR doesn't know the answer to this. Such a move, if taken by IBM, would certainly put lots of facts out in the open. So it will bear watching . . . if more significant change hasn't already come about . . . through the courts.

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Tonic for tired 360/30s

AS IBM QUIETLY "ABANDONS" SYSTEM/360, INDEPENDENTS GRAB BUSINESS OPPORTUNITIES

According to the International Data Corporation's mid-year estimates (EDP/IR Aug. 30,1973), the IBM/370 installed base in the U.S. now exceeds the value of 360s installed here. And that's only part of the story. The portion of 370s on rent is in the neighborhood of 60% -- about the same level hit by 360s in their prime -- while the rental base of 360s is dropping every day. Indeed, by yearend only 15% of this five-to-eight-year-old base of computers -- fewer than 800 360/30s and above -- will be producing current revenue for IBM.

But some 3,000 old workhorse 30s and another 2,000 or so larger 360s will still be owned by third-party leasing companies (60%) or individual users (40%). This represents the customer base IBM is probably trying hardest to upgrade or at least sidegrade into 370, to be sure; it also represents one of the hottest targets around for penetration by independent memory manufacturers; and it's the life-or-death battleground for third-party lessors.

These companies have big investments in 360s, and they are just beginning to see profits after years of under-cutting IBM prices. So stretching the life-span of the third generation is important. For independents, the rehabilitation of obsolete 360s offers a profitable -- if temporary -- market.

Charting such a course, however, means sailing against IBM and its bigger, faster 370s. And as 370s begin to dominate the nation's computing rooms and predominate IBM's rental base, the No. 1 computer manufacturer shows less and less interest in keeping the shine on older 360s . . . an unpromising sign to users who are thinking of renewing 360 leases or retaining purchased CPUs.

On the other hand, price erosion has brought 360 prices way down. Independent memory manufacturers are offering core and semiconductor memory extensions far beyond IBM's standard limits on 360 models and at half IBM's posted prices. Hardware "accelerators" and other innovations from various computer industry imaginators are sparking new life out of old boxes. Greyhound, as discussed below, has even put together a "new" total system from what could be considered "old" hardware. Recent developments focus on the 360/30 . . . not surprising in light of the numbers mentioned above:

Cambridge Memories offers 360/30 memory extensions beyond 128K (and well beyond IBM's standard 64K and special 96K offerings) that fully meet IBM's "transparency" requirements for guaranteed maintenance on the central processor. CM's new transparency feature includes an addressing microprocessor within the add-on memory, bypassing the CPU microcodes that formerly had to be tampered with when memory was extended beyond the 128K range. When the add-on boxes are switched off for CPU maintenance, the CPU reverts to its own microcodes for running diagnostic and test routines with complete independence from the plug-in memory.

In June, IBM inspected such a hookup on one of CM's own computers. Following up its visit with a letter, IBM conceded that it can maintain 360/30 CPUs with CM extended memories all the way up to 256K bytes -- and not simply on the "best efforts" basis imposed on IBM by the courts a year-and-a-half ago.

Cambridge believes there will be strong demand for 360/30 memory extended beyond the 128K range -- for the next year at least -- even though the transpar-

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ency feature adds a little to low add-on memory costs. This is especially true because IBM's announcement of 256K and 524K memory limits for 370/125s and 135s respectively (EDP/IR July 17,1973) may influence the 370 upgrade or sidegrade for users who simply want more main memory. With IBM's new maintenance agreement in hand, Cambridge hopes to liven up a market full of skeptical users who have been hesitant to attach large memories under IBM's "best efforts" policy concerning 360s.

Cambridge prices a "transparent" 128K 360/30 memory at $1,200 a month under a three-year lease and for a full 256K -- four times IBM's usual limit -- charges $2,300 per month. Users who already have Cambridge memories installed may add the transparency feature for a one-shot charge of $750, Cambridge says. This works out to an incremental cost of $8.60/month/Kbyte, right in the mid-range of IBM's implied price of $6.25 on the 370/125 (Mosfet) and $9.75 for the 135 (with extended bipolar). Originally, IBM charged $45 for the 360/30.

Quietly following the same approach, Computer Hardware Consultants and Services Inc. (CHCS), a Pennsylvania-based memory manufacturer, has been turning out IBM-approved "transparent" Model 30 memory extensions since January; so far, it has outfitted nine machines in the 128K-to-256K range. CHCS offers to supply up to one million bytes for 360/30s -- and to handle maintenance through a subsidiary organization -- but there are no takers to date.

Another offering from CHCS is a CPU "accelerator" the company claims will increase internal processing speeds 15% to 30% for the average Model 30 user. With the accelerator -- plus enough memory to add multi-programming capability -- a 360/30 suddenly becomes a new, competitive machine . . . especially for on-line applications . . . according to CHCS.

Other independent memory makers contacted by EDP/IR say they're finding a market for 360 add-on and extension memories even without unqualified maintenance guarantees from IBM. Fabri-Tek, a core manufacturer, says the legal flap about IBM maintenance seems, for all practical purposes, to be over. Customers have "calmed down" after the IBM no-maintenance threat of 1972, and IBM's "best efforts" are indeed good enough to keep equipment running smoothly.

Greyhound Computer Corp. decided that mere defensive measures were not good enough to protect its portfolio of some 300 IBM 360/30s. Opting for a frontal attack on the 370 market, Greyhound decided to become a mainframer, albeit on a limited scale and without actually getting into manufacturing. Its "new" line of Phoenix systems -- based on a 360/30 CPU -- was announced in June as spectacular benchmark demonstrations were run at the National Computer Conference.

Symbolically rising from the ashes of obsolescence in its bright new flame-colored skin, Greyhound's rebuilt 360/30 and new software beat a 370/145 in at least one benchmark test run on the floor of the Show. And now, with six systems installed, the company says it is running ahead of schedule, delivering two systems a month and planning to step up shipments. Pegged as a "total end-user system," the Phoenix supposedly saves customers 50% or so over a comparable 370; Greyhound guarantees system maintenance and handles upgrading.

How did Greyhound do it? The company says it decided to wrap up a bundle of 360 "enhancement" features into one balanced package, and offer this as a "transitional" system that can bridge the gap all the way from 360/30 through to the mystery-shrouded Future System expected from IBM for the late 1970s.

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(FS is alluded to in documents filed in the Telex/IBM lawsuit. EDP/IR soon will present its view of this.)

Starting with one of its own 360/30s, Greyhound adds the CHCS accelerator, plus the ability to handle up to a million bytes of main memory. Disk storage capacity on double-density Calcomp drives provides almost one billion bytes of secondary storage. Finally, enhanced DOS, full 370 program instruction capability, and an extensive data management system pull the Phoenix right into the current computer generation, according to Greyhound.

Expectations . . . for Phoenix

Greyhound expects that at least 100 of its 360/30s will be converted into a Phoenix . . . not enough to make any real dent in the 370 market, but just what Greyhound needs to keep black ink in its books. Less aggressive leasing companies -- which Greyhound management scolds for competing with each other instead of with IBM -- may not fare so well as obsolescence takes its toll and IBM convinces users with leased 360s to move into the 370 generation.

At any rate, first trials of the Phoenix seem to prove that 360 enhancement is a practical, sensible alternative to the planned obsolescence of an across-the-board model change. Greyhound hasn't announced any plans to offer its talent at revival to other 360/30 owners -- individuals or third parties -- but it is an idea that may well find emulators. For its own account, Greyhound seems to think the same ideas could be applied to larger 360s.

. . . for others

For its part, CHCS is pleased with the acceptance of the 360/30 accelerator and is beginning to look to the individuals who own their 30s . . . and it probably wouldn't turn away other leasing companies looking to enhance their inventories. And since 2,500 to 3,000 workhorse 360s should be around -- outside the IBM rental pool -- for several more years, there seems to be great validity in convincing users to stay with 360 until FS comes along.

IBM will naturally try to move this base, but there is growing reason to believe that its resistance to such enhancement activity may dwindle. The Industry Giant stands to gain at least goodwill in letting small competitors make soup with a bone it has already chewed. And acquiescense here could be considered a form of future market development. Who is going to make and market FS, anyway?

FEDERAL GOVERNMENT MOVES BOLDLY INTO SHARED PROCESSORS

In two separate contract awards of $4+ million each, the Federal Government made a significant leap onto the shared processor (key-to-disk) data entry bandwagon this summer, adding spark to what International Data Corp. expects to be a $100-million shipment year. The orders are for two separate parts of the government:

- Computer Machinery Corp. -- under a $4.3 million contract believed to be the largest key-to-disk buy ever made by the government -- is to replace keypunches at Naval data processing installations across the country. A total of 50 systems are involved.

- Four Phase Systems -- under its $4.08 million contract -- will be replacing keypunches at the Social Security Administration.

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The exact number of keystations in each order wasn't disclosed; based on information in its files, however, EDP/IR estimates that upwards of 700 stations will go to the Navy, as many as 900 to Social Security. CMC systems, on average, tend to have more stations per processor. As the table below shows, each of the orders represents a significant amount of business for the two companies:

U.S. SHARED-PROCESSOR MARKETPLACE -- NUMBER AND VALUE INSTALLED, YEAREND 1972
(Copyright 1973 -- International Data Corporation)

Company	Stations Installed No.	Stations Installed %	Dollar Value Installed $ M	Dollar Value Installed %
CMC (incl. Redcor)	6,500	28%	44	29%
Inforex	9,000	40	41	27
Honeywell	1,800	8	17	11
Entrex	1,800	8	15	10
Mohawk	800	4	7	5
Four Phase	1,300	6	6	4
Others	1,800	6	20	14
TOTALS	23,000	100%	$ 150 M	100%

For 1973, IDC expects the companies listed above to ship about 16,000 stations, worth a total of $150 million, for the biggest year ever in shared processors. Starting in 1974, key-to-disk system shipments should begin a decline as large keypunch installations available become more scarce, the trend toward direct data entry begins to really catch on, and IBM's magnetic media input device begins to have an effect.

The 3740 -- IBM's "floppy disk" offering in the data entry area (EDP/IR Feb.19,1973) -- is being shipped, and some 3,500 should be installed by yearend. This number could well exceed 10,000 by yearend 1974 if initial expectations are met. If not . . . if acceptance of the 3740 is weak, as early indications show . . . there's another family of data entry products waiting in the wings. According to documents released in the Telex/IBM trial, this family -- which has shared-processor characteristics -- was actually favored by domestic IBM management. It could be ready for delivery by late 1974 or early 1975.

In any event, there is a definite trend toward communications-oriented data entry and/or mixed media systems. And IBM has definitely decided to replace the ubiquitous keypunch. So 1973 will likely be the peak shipment year for the key--to-disk system as it is "classically" defined -- even though it is the approach that, just now, is finally being taken in earnest by the U.S. Government. This doesn't mean the end of shared processors; IDC forecasts that this equipment -- excluding IBM 3740s and any similar independent entries -- will grow from the 39,000 level at yearend 1973 to some 65,000 four years later. But the numbers shipped each year will drop dramatically, and prices will decrease. This is the peak shipment year.

IBM BEEFS UP SYSTEM/7, EDGES DEEPER INTO MINICOMPUTER MARKET

When IBM unveiled its new version of System/7 last month, it carefully avoided using the term "minicomputer." That word apparently doesn't exist in the lexicons of White Plains or Armonk. But with four times its previous memory capacity and new stand-alone programming capabilities, IBM's "larger capacity model"

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of its "lowest-cost computer" sure edged a little closer toward the realms of genuine minidom.

Industry observers have been expecting an IBM move into the booming mini market for several years . . . and this certainly isn't it. But there's little question that the newest System/7 will be competing more directly than ever with products of such classical minicomputer manufacturers as DEC, Hewlett-Packard, and Data General. And truer to the rules of miniland than the business community, this competition starts soon. Customer shipments begin in December.

Better for complex jobs . . .

IBM says the reason for expanding the System/7's memory up to 65,536 words (of 16 bits) and providing for independent programming in higher level languages such as Fortran IV is to "broaden its scope of sensor-based applications." The most common use for System/7s to date has been in such special real-time applications as process control, laboratory automation, and flow monitoring -- almost always under the supervision of a larger IBM host computer.

Now, according to IBM, System/7 can cut the apron strings and work on its own -- handling several jobs or a single complex application without help from a central machine. Yet, the expanded System/7 still is definitely aimed in the specialized direction of real-time process control. The new version has I/O modules for attaching up to 384 analog sensors -- three times as many as before. So the new model still will find wide use in production line control, materials handling, refinery and chemical plant flows, lab testing, and power generation.

. . . and the popular communications environment

The new System/7 (it has no special "name" or number) also is designed to fit more effectively than ever into a communications environment. It has an option for a binary synchronous communications adapter (but no mention of synchronous data link control -- EDP/IR Aug.23,1973) for communication at up to 50,000 bits per second with a System/370, a System/3, or another System/7. But the emphasis seems to be on the expanded S/7's ability to go to work for a user who doesn't want or need a big IBM mainframe for backup. If that's true, it's almost enough to bring the word "unique" out of its EDP/IR retirement. IBM's computer products are designed, pure and simple, to sell more memory and mainframes.

Prices for sensor-based systems vary all over the place. IBM did pick out one this time around -- with 16K processor, an I/O sensor module, a disk module, and an operator station -- and said it would cost $64,000 or rent for $1,600 a month. Also, IBM's press release said that 4K modules of the extended bipolar, 400-nanosecond memory will rent for $135. Changing words to bytes, that implies $16.88/Kbyte/month . . . more than twice the charge for the same type memory in the 370/135, but it is packed in boxes only 1/8th the capacity. The purchase price on the memory is $4,725 -- a low, low 35-month ratio. Interesting tidbit.

********** TELEX/IBM DECISION DUE **********
* On Monday, September 17 (the second anniversary of the day RCA dramatically *
* abandoned the mainframe business), Judge Sherman A. Christensen has said he *
* will hand down his decision in Telex vs. IBM (EDP/IR June 22,1973). *
* EDP Industry Report has made extensive provisions to obtain a copy of the *
* decision as rapidly as possible. In cooperation with IDC's Senior Staff, we *
* will prepare a Gray Sheet analyzing this possibly historic ruling, and make *
* every effort to mail it before the week is over. -- The Editors *

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" SEPTEMBER 24,1973 • VOL.8,NO.22 P.J.McGOVERN,EDITOR

"To aid proper competition . . . discourage improper competition"

IBM GUILTY OF MONOPOLY IN PLUG-COMPATIBLE MARKET: TELEX AWARDED $352.5 MILLION, TOLD TO PAY IBM $21.9 MILLION

Cracking down hard on both parties involved, Judge Sherman A. Christensen -- in deciding the largest antitrust case in history -- declared IBM a monopolist in a marketplace it had created . . . then told Telex it had no right to steal.

> *Mindful of plaintiffs' burden and . . . recognizing that many of Telex's financial difficulties have resulted from the inherent nature of its business of producing products functionally equivalent to those first produced by IBM . . . in my judgement the preponderance of the evidence before me . . . compels the conclusion that IBM's unlawful conduct in violation of Section 2 of the Sherman Act has had not only substantial but severe impact upon the plaintiffs' business . . .*
>
> *Telex obtained . . . trade secrets from IBM by a massive and pervasive program . . . We have been confronted here by a widespread, purposeful effort of Telex to secure confidential technical information concerning the design of products which were then unannounced, for the purpose of duplicating such equipment . . .*

So . . . the Judge calculated damages (page 2). The harm done Telex was $117.5 million, which gets trebled by law; the injury to IBM was $21,913,776. In addition, both parties were ordered to abide by some rules (pages 4 and 5) designed to prevent any reoccurrence of their crimes.

IBM, as a result, has been told to quit collecting termination penalties on long-term leases, to disclose peripheral interface specs as soon as a product is announced or goes into production, to price 370 memories separately from CPUs, to use the same percentage markup on all functionally similar products, and to refrain from any other acts designed to hold or obtain a monopoly in peripheral products compatible with its CPUs.

Telex, for its part, must destroy or return the IBM documents it copied . . . and it can't use IBM employees to work on projects similar to those on which they worked at IBM. Its slap gives fair warning to other independents. But there's no getting around it: IBM has been beaten . . . budged a little from its position. As a result, there is hope and joy in peripheral land.

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Damages: Ask and ye shall receive?

The parallelism in this case -- involving Telex's charges and IBM's counterclaim (EDP/IR June 22,1973) -- carries down the line, even though EDP Industry Report isn't trying to disguise the facts: The primary significance of the decision is its impact on IBM and the entire industry. But, in applying the law sternly to both sides, the Judge went a long way toward granting each of them what they had asked for. The equitable relief (center pages) grants much but not all of what was asked by each side.

And the damages follow the outlines of what was requested. Here's a breakdown of the two figures as calculated and explained by Judge Christensen:

Telex's Request		Granted
Profits, deprivation of market share . . .	$257.7 million	$ 70.0 million
Lost rentals (shipments before 4/1/72) . .	22.4	20.0
Lost rentals (reasonable ship. after 3/72)	69.9	19.0
Lost sales profits	11.3	8.5
TOTAL	$361.3 million	$117.5 million

IBM's Request		Granted
Statutory damages (copyright violation). .	$ 15,758	$ 13,776
Lost rentals (3420 tape drives/controllers)	6,800,000	4,500,000
Other advantages (3420 and 3330)	35,000,000	13,000,000
Increased security (1971 and 1972)	4,000,000	3,000,000
Additional mfg. cost (3330 head arm) . . .	440,000	400,000
Punitive (unlawful conduct).	1,000,000	1,000,000
TOTAL	$47,255,758	$21,913,776

To oversimplify, the Judge seemed to accept as almost fact figures having to do with past events, but was much less willing to "buy" the intangibles. But he is confident the award to Telex, which is trebled "as required by law," is right:

> *. . . any greater amount, although supported by some evidence, would be speculative and not supported by preponderant evidence applying the rule of liberality enjoined by the authorities. Weighing all relevant factors it is believed that any less amount would be contrary to the preponderance of the evidence and accordingly also a miscarriage of justice.*

Industry implications

No sooner had the decision been announced than lawyers and legal departments, sensing a chance for action, were shouting: "Sue." Indeed, Calcomp, Itel, and Memorex, among the independent peripheral manufacturers, said they were studying the situation. Lots of other companies probably are, too. And there is talk of user suits, although there is a question as to what could be expected in these.

Any other cases would have to be tried from scratch, but if they involved essentially the same time period and types of equipment, "could be brought in 30 days given a copy of the Telex/IBM documents and a Xerox machine," according to A.G.W. "Jack" Biddle, executive director of the Computer Industry Association. And if Telex represents 47% of the plug-compatible market, as figures presented in this case tend to show, then IBM's total liability -- under a judge who found

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FINDINGS: RELEVANT MARKETS . . . AND MONOPOLY POWER

"On the basis of all of this testimony with reference to market shares, inferences that may be reasonably drawable therefrom, direct testimony as to IBM's domination of the relevant markets and submarkets, and the effect upon competitors in this market and submarkets of its predatory competitive practices, during the period 1969 to 1972, inclusive,

"I find IBM possessed monopoly market power in the relevant market of peripheral equipment plug compatible to IBM CPU's and in the relevant submarkets for magnetic tape products, direct access storage products, memory products, impact printer products and communication controllers plug compatible with IBM central processing units.

"The court further finds in this connection that this general market and the submarkets specified above comport to the competitive realities of the period; that by reason of the peculiar development of the EDP industry with the historical domination of IBM in the general systems market, with the market of plug compatible peripherals growing up, in historical and developmental fact, as a separate competitive entity along with its submarkets, the separate reality of this market along with its submarkets cannot be dismissed or ignored as a mere example of a manufacturer necessarily having a monopoly of its own product.

"The court further finds that whether the submarkets hereinabove defined be considered separately and severally or whether they be combined into the market for peripheral EDP equipment plug compatible with IBM CPU's, monopoly power during all periods material herein was possessed and exercised by the defendant IBM.

exactly the same degree of guilt and used precisely the same formula as that invented by Judge Christensen -- would be $250 million, times three. Such is unlikely to be the case, but the calculation does put a first handle on what the implications of the decision might mean to IBM.

Of equal if not more importance will be the impact of the equitable relief ordered on IBM's operations. In a nutshell, it will make things more competitive . . . exactly what antitrust litigation is all about:

- Plug-compatible manufacturers will be in a better position -- money should be easier to come by, and products easier to deliver at the same time as IBM. They will not be caught with the shorter marketing cycle that now cuts into profits.

- Users will be more encouraged to obtain CPUs from IBM and peripherals from independents. Further, they will not be locked to IBM by term leases, and can even adopt a "show me" attitude.

- The marketplace cleavage into two "camps" -- the IBM type and the "other" -- will be accelerated. To some extent, restored confidence in PCMs as alternate sources of supply could impact account-switching on the part of non-IBM mainframers. Alternately, success for the PCMs could move them into other mainframe markets.

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JUDGMENT AND DECREE

The issues having been duly tried to the court, findings of fact having been made, and conclusions of law having been entered; now, accordingly,

IT IS HEREBY ORDERED, ADJUDGED AND DECREED:

1. That plaintiffs, The Telex Corporation and Telex Computer Products, Inc., have and recover judgment of and from the defendant International Business Machines Corporation in the sum of $352.5 million, after the found actual damages have been trebled as required by law, together with costs and attorneys' fees, the amount of such attorneys' fees to be reserved for future determination.

2. International Business Machines Corporation is hereby permanently enjoined from enforcing or collecting any contractually specified penalty payments which it otherwise might be entitled to collect because of termination upon ninety days' notice of any long term lease agreements heretofore entered into between IBM and any of its end-user customers, including but not limited to IBM's Fixed Term Plan leases, Extended Term Plan leases and Term Lease Plan leases. For a period of three years from and after the date of this judgment International Business Machines Corporation is enjoined and prohibited from including in any lease agreement for electronic data processing products for terms in excess of 90 days any provision requiring payment of any liquidated damages or penalty because of the customer's earlier termination of said lease agreement.

3. At the time of a product announcement concerning any EDP product, or at the time of release of such product for manufacturing and production, whichever first occurs, International Business Machines Corporation is enjoined and required to publicly describe and disclose the design of the electronic interface for such product in sufficient detail as to make feasible the reproduction of such interface by other qualified manufacturers; and within 60 days from the entry of this judgment, International Business Machines Corporation shall similarly describe and disclose the details of the design of the electronic interface for each System 370 EDP peripheral product that it has announced heretofore.

4. International Business Machines Corporation is enjoined and prohibited from single or "bundled" pricing of IBM memories with its System 370 central processing units, that is, from charging a single price for both the central processing unit and the memory, and within 60 days IBM shall separately price its CPU's and memories. This does not prohibit, restrict or enjoin International Business Machines Corporation from selecting any particular physical locations or packaging of its products so long as these requirements and those stated in the next succeeding paragraph are followed.

5. International Business Machines Corporation is enjoined and required to separately price its functionally different products, including but not limited to central processing units (CPU's), memories, tape products and their controllers, disk products and their controllers, printer products and their controllers and communication controllers regardless of whether it elects to place such products in single cabinets or in multiple boxes or cabinets. International Business Machines is further enjoined and required to set its prices for all such functionally different* EDP products by using

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or applying a substantially uniform percentage markup over actual designing, manufacturing and marketing costs as between such integrated and separately boxed products.

6. International Business Machines Corporation is enjoined from adapting, implementing or carrying out predatory pricing, leasing or other acts, practices or strategies with intent to obtain or maintain a monopoly in the market for EDP peripheral equipment plug compatible to its CPU's, or any relevant submarkets thereof.

7. International Business Machines Corp. shall have and recover from Telex Corp. and Telex Computer Products Inc., the total sum of $21,913,776, made up by the Conclusions of Law shown, together with costs and attorneys' fees in connection with its copyright claim to be hereinafter fixed.

8. Telex Corporation and Telex Computer Products Incorporated are enjoined:

a. To return to IBM all IBM documents and all Telex documents containing IBM confidential information which are in Telex's custody or under its control, and to destroy all copies of Telex manuals under its control or in its custody which infringe IBM copyrighted manuals.

b. To refrain from hiring or soliciting any IBM employee for a period of two years without approval from the court.

c. To refrain from copying any IBM copyrighted materials.

d. To refrain from soliciting or using any IBM confidential or proprietary information.

e. To refrain from assigning any former IBM employee employed now or in the future by Telex to the development or manufacture of products functionally equivalent or similar to those on which such employee worked at IBM for a period of not less than two years following the termination of his employment with IBM.

9. Except for the fixing of the amounts of attorneys' fees and costs to which the respective parties are entitled, the court pursuant to Rule 54(b) Fed. R. Civ. P. determines that there is no just cause for delay in the entry of this judgment, and the clerk is hereby directed to enter final judgment in accordance with the foregoing forthwith on all issues except as to the amounts of the attorneys' fees, which shall be covered by supplemental judgment, there being hereby granted a stay of execution until the disposition of the post-trial motions hereinafter mentioned, or until the court otherwise orders.

10. For the purposes of fixing the amounts of said attorneys' fees, considering any motions filed within ten days of the entry of this judgment for correction of the findings of fact, conclusions of law and judgment pursuant to Rule 60(a) Fed. R. Civ. P., or to amend findings and judgment pursuant to Rule 52(b) Fed. R. Civ. P., or to alter or amend judgment or for a new trial pursuant to Rule 59(a), (e), Fed. R. Civ. P., a hearing will be held at the United States Courthouse, Tulsa, Oklahoma, on October 16, 1973, beginning at the hour of 10 o'clock a.m.

*EDP/IR notices some confusion. At two other places in his decision -- in discussing equitable relief (findings of fact), and in describing the decree (conclusions of law) -- Judge Christensen makes the same point, but uses the word "similar" rather than "different." See text.

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AN ENLIGHTENED JUDGE DESCRIBES THE COMPUTER INDUSTRY . . . AND HIS SOLUTION

From the very first words in his Decision . . . to the last, Judge Christensen illustrates the insight he brought to bear in this case. Here is how his decision begins . . . and how it ends 217 pages later:

"This case involves the electronic data processing industry -- an industry based upon a concept and system of reckoning (binary) as simple as turning on and off a switch;

"in which transmissions are timed in billionths of seconds (nanoseconds), storage capacity (memory), measured by millions of combinations of bits of information (megabytes);

"in which numerous problems involving logic or arithmetic functions are separately but simultaneously worked upon and instantly solved within a single system;

"in which in their own peculiar language machines communicate with one another (multiprocessing) and then in words understandable by humans may present printouts of results at the rate of as much as 2,000 lines per minute;

"in which devices facilitate maintenance by the detection and isolation of their own malfunctions or mistakes (diagnostic programs);

"upon which most other industries of the country and countless businesses as well as science and space explorations, vitally depend;

"in which product and market developments seem almost kaleidoscopic when viewed from the outside;

"which appears unique in monopoly context by reason of its youth and apparent dynamics, but which by the same token in this ultra-modern setting may be unprecedented also because of increased inducements for, and vulnerability to, sophisticated submarket control on the one hand, and massive industrial espionage on the other."

. . .

CONCLUSION

"In sum, under the facts and the law of the case it has been concluded that plaintiffs' complaint has required vindication in the manner provided above in justice to them and in aid of proper competition; that defendant's counterclaims similarly have required vindication in justice to it and in discouragement of improper competition."

There is a question as to the meaning of point 5 in the Judgment and Decree (pages 4 and 5). Although the provision for IBM's requirement of setting prices by applying a uniform percentage markup is related to "functionally different" equipment in the decree itself, this idea is presented two other times in the decision . . . and each time in the body of the document it refers to "function-

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. . . THEN PUTS "IBM'S PRACTICES AND INTENT" INTO PERSPECTIVE

"IBM's growth and success in the industry have been due in substantial measure to its skill, industry and foresight. It has tended to set the standard for quality in the EDP industry for products and services. It has met notably favorable response in the market, and has been deeply involved in the phenomenal growth of the industry since almost its beginning. Each succeeding generation of IBM products has represented some technological improvement over the preceding generation and has involved development of new processes, storage devices, input/output devices and software.

In the approximately twenty years that the EDP industry has been in existence IBM has introduced more than 600 products. Some of these products include major technological innovations. By virtue of its own research and development, IBM has obtained more than 10,000 patents which are freely licensed. I therefore cannot fully agree with Telex's contention that "IBM did not gain, nor has it maintained its position in the industry through skill, industry and foresight". No doubt it gained a dominant position in the industry through a praiseworthy degree of these qualities.

Whether there was anticompetitive conduct that went along with them in recent years prior to 1969, the record does not disclose. The real problem here is notwithstanding this, whether IBM has maintained its monopoly position, or attempted to do so, by unlawful conduct since 1969. In the respects determined here in the critical period at least it must be recognized that its diligence and foresight have included the competitice studies and the anti-competitive objectives and intent heretofore found, and that particularly as applied to this case have included an attempt to substantially constrain or destroy its plug compatible peripheral competition by predatory pricing actions and by market strategy bearing no relationship to technological skill, industry, appropriate foresight or customer benefit.

With such intent and objectives manifest with respect to its plug compatible competition, it is understandable that the defendant should be particularly opposed to the recognition, as essentially separate entities or markets, of what was initially a part and parcel of its own internal business over which it exercised legitimately a 100% control--the peripherals attached to its own developing system.

But we find unconvincing the idea that separate markets or submarkets actually recognized by IBM itself in this dynamic and amazing industry could not have been developed eventually from IBM's prior lawful domination of it; or that the objectives and planning of such a presently dominating force against the competition of the peripherals could somehow be deemed dissipated among lower echelons of this great organization and not considered to be reflected in the competitive actions of top management, or that, if reflected, should be held innocuous or futile, or at all events lawful, as competitive weapons."

ally similar" EDP products. Further, a close reading of the modifier -- "as between such integrated and separately boxed products" -- implies the "similar" interpretation, which is what Telex asked for. The matter is sure to be clarified October 16, but meanwhile EDP/IR believes it applies to such products as integrated controllers -- not to everything IBM chooses to build.

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". . . A YOUNG, DYNAMIC AND GROWING INDUSTRY"

The day after Judge Christensen handed down his decision, Frank T. Cary, IBM's board chairman, sent a letter to stockholders. In it he said:

> ". . . we are convinced that the judge's ruling against IBM goes beyond that of any judicial precedent and contains serious errors of facts and law.
>
> ". . . the damages . . . awarded Telex are scarcely supportable under any theory . . . this award . . . suggests that Telex could have in a period of three years increased its profits more than tenfold. This is a highly unusual growth rate.
>
> "We will seek an expedited decision by the U.S. Court of Appeals . . .
>
> ". . . we are in a young, dynamic and growing industry; we intend to remain a leader in it and to grow with it."

Interestingly, the Judge seems to have thought about this . . . and essentially had presented his "rebuttal" in the decision:

> ". . . monopoly is possible in a young, dynamic and complex industry as well as in an old or static one, and may be even more feasible in special cases through masking of selective market strategies in the overall technological developments.
>
> "Sophistication of users or competitors may discourage monopoly but equal or greater sophistication on the part of an alleged monopolist may be a counterbalancing factor, and industry dynamics may continue in evidence through technological momentum beyond the inception of monopoly. While these and other criteria and their limitations have been considered, it is recognized that the question of monopoly control is one of fact to be determined on the whole record and not susceptible of being resolved by any mechanical applications."

A thoughtful judge . . .

Throughout this issue, EDP/IR has presented much of the case in the words of Judge Christensen . . . primarily to illustrate the depth of industry understanding he seems to have acquired. The entire 217-page decision is one of the best explanations of a complex situation we have ever seen. It was written in 90 days, following three months of trial with 20,000+ pages of evidence.

. . . on solid ground

The decision is comprehensive and far-reaching. Yet, according to legal experts who have examined it, seems to be solidly built on the law. Continually examining not theory, but the realities of the marketplace, Judge Christensen walks through the plug-compatible peripheral equipment business, and decides it is one. He examines the intent of actions . . . recognizes IBM for the competent organization it is . . . calls a spade a spade. He tosses out the case for supply substitutability and refuses to declare integrated controllers predatory. In all, he looked for, and may have found, not isolated datum, but reality.

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"THE GRAY SHEET" SEPTEMBER 28,1973 • VOL.8,NO.23 P.J.McGOVERN,EDITOR

Customer loyalty study

IBM HEADS FOR NEW LOYALTY RECORD AT SINGLE-VENDOR SITES; OTHER MAINFRAMERS SUFFER 1972 SETBACK, BUT SOME REBOUNDING

New products spark marketplace activity . . . and keep existing customers happy. Simple as these words may sound . . . true as they are of so many markets, their apparent denial seems to be the major factor behind 1972's across-the-board plunge in loyalty ratings for all the non-IBM full-family mainframe manufacturers. As IBM satisfied 90% of its single-vendor customers during 1972, and set the stage for an all-time record loyalty rating this year (pages 2 and 3),

- Burroughs, loyalty pace-setter for five years, failed to convert many of its expansion-minded B300 and B500 users. As a result, its loyalty rating dropped below the 80% mark for the first time since 1966. On the plus side, Burroughs posted the largest competitive gain of any mainframer -- winning at nearly five sites for every upgrade bid it lost. And prospects for 1973 look a little brighter.

- Honeywell, a steady gainer in loyalty even while it absorbed the GE customer base, stayed almost even during 1972, with loyalty in the "high seventies." Perhaps befitting its station as Number Two mainframer, HIS lost just over one-third of all the non-IBM sites reporting . . . and, its proportion of disloyal customers going to IBM was smaller than that of any other vendor. But user actions or intentions for 1973 indicate that HIS may end up this year with the second-lowest loyalty of the big vendors.

- NCR, a "star" in the new-user market for several years, witnessed an end to a "comfortable" period of loyalty last year as 315 and Century users alike began an exodus to the IBM fold. But the movement apparently has been stemmed; preliminary 1973 loyalty for NCR looks like a six-year company record of 80%.

- Univac, perennial "low man" on the loyalty ladder, slipped back to the 50% level it finally broke in 1971. And as scads of 9200 users turned to System/3, and the small number of RCA users who shifted equipment opted almost exclusively for 360s or 370s, the Number Three supplier won't be able to prevent its loyalty from sliding below 50% when the 1973 score is completely tallied.

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VENDOR LOYALTY STUDY: SUMMARY PROFILE

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	(1) Customers Gained From Competitors	(2) Customers Lost To Competitors	(3) Customers Re-Ordering From Vendor	% LOYAL* 1971 Actual	1972 Actual	1972 Forecast	1973 Forecast	% Competitive Gain or Loss+ 1971	1972
BUR	88	18	69	86%	79%	91%	82%	54%	80%
HIS	95	59	213	79%	78%	75%	74%	22%	13%
NCR	44	50	99	76%	66%	82%	80%	30%	-4%
RCA/UNV	61	78	78	60%	50%	46%/50%	45%	88%/-13%	-11%
Other°	31	6	8	43%	57%	SS	SS	SS	SS
Non-IBM SUBTOTAL	319	211	467	74%	69%	75%	69%	27%	16%
IBM	136	244	2212	82%	90%	94%	92%	-11%	-4%
TOTAL	455	455	2679	80%	85%	90%	86%		

* % LOYAL = $\frac{(3)}{(2) + (3)}$

NOTE: 1972 Actual figures reflect movement shown, and are based on a sample size of 3134 sites (vs. 1401 sites for 1971 Actual). Forecast for 1973 based on 1316 sites (vs. 197 sites for 1972 forecast made in previous study).

\+ % Competitive Gain or Loss = $\frac{(1) - (2)}{(2) + (3)}$

° Group A systems from CDC, DEC, Friden, Memorex, & Xerox

SS -- Small Sample (Data not shown)

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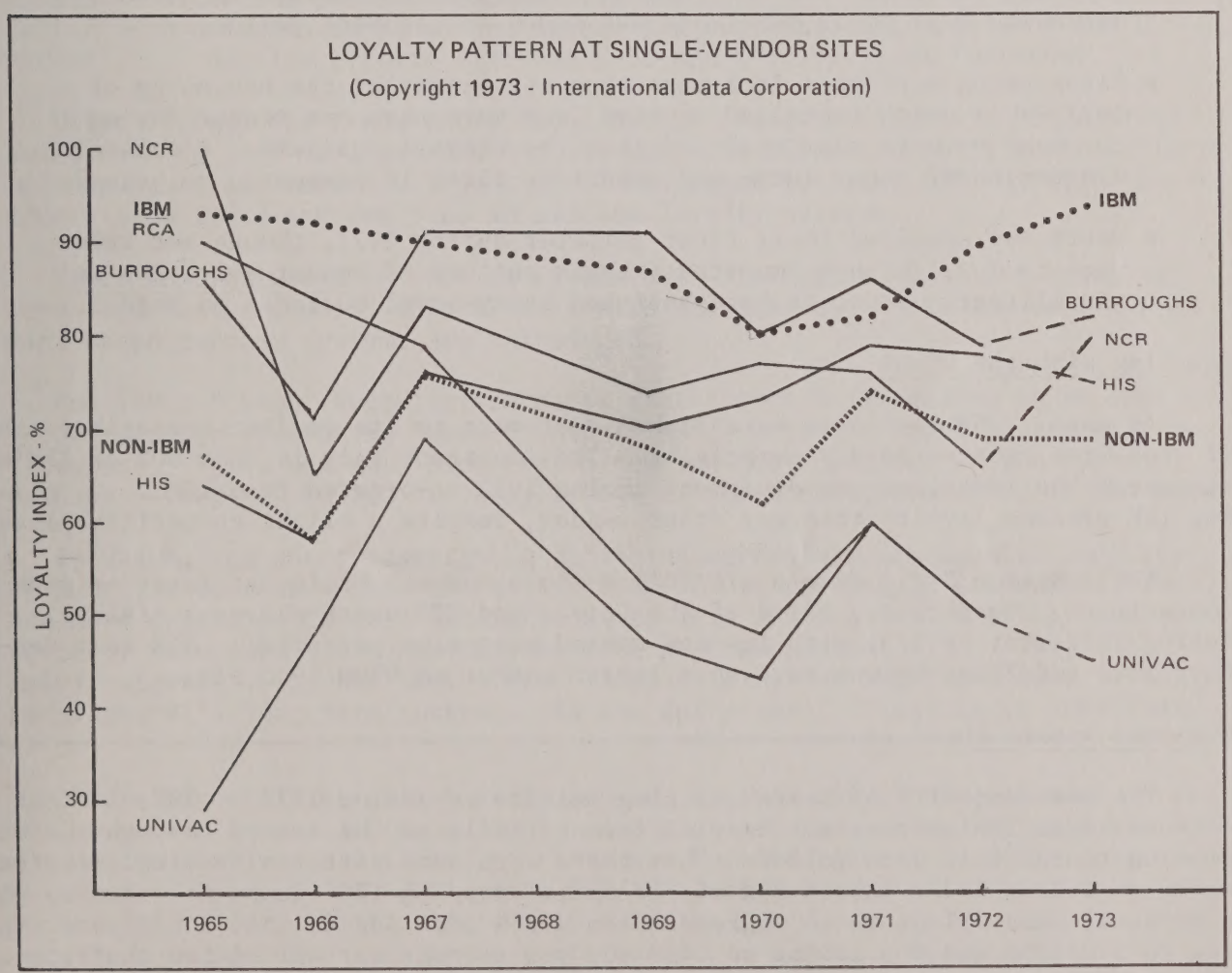
In conducting this statistical study (see below) EDP Industry Report did not talk to users about their reasons for retaining or changing suppliers when they shifted equipment. But our analysis of the movements strongly suggests that, in more than a casual number of cases, the age of equipment -- the lack of product line "excitement" -- played a substantial role in the decision-making process. IBM and Burroughs -- the vendors with the better records in this study -- are the two that have brought truly new products to market most recently.

Caution . . . Stop! Look! Listen!

EDP/IR feels reasonably confident in the trends, highlights, and probable meanings reported in this issue. But care is necessary, lest the data be used for more than it is intended.

This loyalty study, conducted every year or so, usually "opens" to mixed reviews from the mainframe manufacturers it analyzes. This year -- by moving the study's execution to the fall rather than carrying it out during the spring as had been the pattern (EDP/IR Apr.12,1972) we can provide much firmer results for 1972. In addition -- by including actual movement during 1973's first half plus our reports of user intentions -- we are able to present preliminary 1973 figures that have a much higher confidence level. Still, as always, EDP/IR urges readers to consider very carefully the restraints and conditions on this measurement of "brand loyalty" in the computer industry.



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To calculate the loyalty figures that appear in this issue, EDP/IR's research staff analyzed reports from computer users who, according to the Data Files maintained by International Data Corporation, took delivery of a system during 1972. We also analyzed reports of systems already installed during 1973, or ordered for delivery this year and beyond. Results from these 3,134 sites for 1972 and 1,316 sites for 1972 and beyond are summarized on page 2, where the formulas used for calculating loyalty and competitive gain or loss are shown. The loyalty ratings from this and prior EDP/IR studies are plotted on page 3. Other conditions:

- Only U.S. sites (and U.S. vendors) have been studied. Some manufacturers might show different loyalty levels in other countries.

- All figures are based on number of sites. Many of the sites examined have only small systems. Naturally, vendors consider the loss of a large, established site much worse than desertion by a "small" customer with fewer dollars to spend.

- Equipment acquisition method is not considered. Thus, users who decided to purchase their equipment or lease through a third party are not considered disloyal.

- Only general purpose, of Group A computers are considered for this study. Purchases of minicomputers, or terminals that replace computers, are excluded from the totals. Likewise, no measure is taken of users who kept their mainframe but added independent peripherals.

- Sites using equipment from more than one vendor at the beginning of 1972 -- or which installed systems from more than one vendor during the year -- were also excluded from the overall analysis. A separate discussion of these large and important sites is presented on page 7.

- Users who acquired their first computer during 1972, though not relevant to loyalty, are important; their pattern of vendor selection is significant. Thus, we have analyzed entry-level business on page 5.

Jousting with the Giant

As usual, IBM lost more established customers to its smaller competitors than it took from them -- hardly surprising. The important fact is that 90% of IBM's customers who installed new equipment during 1972 re-ordered from IBM . . . giving IBM greater loyalty than any other vendor, despite a slight competitive loss.

IBM's System/3 did take a big toll -- on a numbers basis, at least -- from competitors. More than a third of the Univac and NCR users who were disloyal during 1972 went to S/3, with its new upward expansion potential. NCR lost Century 100s and 200s; Univac gave up a larger number of 9200/1900 sites.

Movement within the fold

The vast majority of users changing mainframes during 1972 -- 78%, in fact -- were loyal IBM customers. Many different trails can be traced through the migration routes that were followed, but there were some patterns in single-system movement during 1972. About 30% of the users swapping IBM equipment ended up with a System/3, and 75% of those migrated from a 360/20. Add to that 360/30 users going to 370/135s and 40s moving to 145s and you account for 45% of the shuffling.

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WAVES OF CHANGE IN ENTRY-LEVEL BUSINESS

Anything more than a cursory glance at the table of new site vendors (below) is almost like a refresher course in entry-level systems of the Seventies . . . started as they were by first deliveries of IBM's System/3. The marketing strategies of each manufacturer -- and hints of IBM moves to come -- are reflected in the numerical waves.

Burroughs, after holding its own -- at best -- for several years, now shows signs of reaching out more aggressively for new customers with its 700 and 1700 computers.

CDC's new sites don't really represent "entry level" business; rather, they tend to be new service bureaus or new installations built by existing customers.

HIS' new customer prospects are looking up, as the H-2020 starts to catch on. An earlier stab at the System/3 market (with the G-58) was never really successful.

ANALYSIS OF NEW SITES, BY VENDOR

	1970	1971	1972	1973*
Bur.	4%	3%	3%	7%
CDC	2%	-	1%	2%
HIS	8%	10%	8%	11%
NCR	18%	15%	11%	8%
U/RCA	8%	7%	6%	4%
Other	1%	1%	4%	4%
IBM	59%	64%	67%	64%
	100%	100%	100%	100%
Sample:	446	738	1344	435

* Estimate, based on orders

NCR -- after its pre-S/3 bonanza with the Century 100 -- seems to be headed toward its numerical share (7%) of the U.S. market . . . despite efforts with the C-50 and C-101 product "extender."

Univac's need for a new entry-level system shows up clearly. RCA contributed nothing in this area; and the six-year-old 9200 apparently doesn't "turn on" new users any more . . . just as it has begun to "turn off" existing customers (see text) and continue an old low-loyalty pattern.

Other manufacturers -- such as Friden with its System 10 -- are becoming more important. Indeed, this trend toward new user diversity may continue as mini-based turnkey systems are introduced.

And IBM's "graph" suggests, perhaps, that System/3 is peaking as an entry-level computer (and being "grown" into a family with the Model 15 recently introduced). It is one more hint that a new low-cost computer -- the System/1, perhaps -- may not be too far away. Many things hint at something in the wind.

By value, new users represent a declining percentage of computer industry shipments each year -- something less than 10% at present. Furthermore, they are more expensive to sell and service, so less profitable. But they are absolutely necessary to any mainframer with a broad product line. They ultimately upgrade . . . and their future loyalty plays an important role in any manufacturer's long-term success. So the entry-level situation is important.

There are still bargain-hunters around. A full 25% of the movement in IBM's loyal base was from a 360 to a 360 (no doubt at cut-rate prices) within the lower half of the family. Additionally, there was "profit taking" by IBM's larger users who moved to System/370. While most 360/40 users selected a 145 or larger, almost 30% moved to a 135. Similarly, nearly half the 50s downgraded to a 145. Thus, users seem to say they want price/performance . . . but in small doses.

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INDUSTRY LOYALTY PROFILE: 1972 vs. 1971
(Copyright 1973 -- International Data Corporation)

	SIC	IBM LOYALTY* L:N	1972	1971	NON-IBM LOYALTY* N:L	1972	1971
Agriculture, Mining & Construction	01-17	36:6	86%	84%	9:6	60%	50%
Chemical & Petroleum Processing	20-31	366:41	90%	88%	60:26	70%	67%
Durable Products Manufacturing	19+32-39	453:48	90%	83%	66:37	64%	70%
Transportation & Utilities	40-49	166:8	95%	81%	26:13	67%	83%
Wholesale & Retail	50-59	225:26	90%	85%	60:22	73%	79%
Finance & Insurance	60-69	383:20	95%	87%	83:35	70%	85%
Non-Professional Services	70-79	15:3	83%	71%	6:0	100%	50%
Health-Hospitals	80	68:8	89%	77%	24:8	75%	92%
Colleges & Universities	82	126:32	80%	66%	13:15	46%	57%
Computer Services	89&73	211:22	91%	87%	66:30	69%	83%
Federal Government	91	3:1	75%	71%	-	-	57%
State Government	92	45:6	88%	93%	18:5	78%	56%
Local Government	93	93:20	82%	57%	28:11	72%	78%
Unknown	xx	22:3	88%	84%	8:3	73%	57%
TOTAL		2212:244	90%	82%	467:211	69%	74%

* LOYALTY = L/L+N

And the cost-conscious mood of 1972 shows through another way: IBM users had far less inclination -- or need -- to add new computers to their sites than they did in 1971. They tended to opt for complete system replacement instead. Additions to loyal IBM sites accounted for only 2% of systems installed at single system sites, versus 11% in 1971.

Drawing the lines of battle

Looking at the competitive interaction among all the other manufacturers is even more difficult than painting the IBM movement picture; but a few general observations can be made. Only RCA lost more sites to IBM than it gained in return (with a lopsided 20-to-3 score, see below). NCR traded almost site-for-site with IBM (34 vs. 33), while Burroughs aggressively took 60 sites to IBM's 10. In all, IBM showed a net competitive loss of 4% (108 sites in the sample).

Honeywell, with its small losses to IBM, dropped 36% of all the sites traded within the non-IBM group. Burroughs, on the other hand, picked up 37% of all the sites lost by the "dwarves" to one another. Favorite targets among these manufacturers were systems more than five years old -- Univac's 9200 and 1105; Honeywell's 120, 115, and 200; NCR's 500 and 300; Burroughs' 300 and 500.

Within Univac's RCA base, the widely publicized 90% retention figure is not contradicted by EDP/IR's study. Few users made any upgrade decision during 1972. But the loyalty figure for this sub-base is 55%, with 20 out of 27 defectors turning to IBM. Nearly half the disloyal Honeywell users went to Burroughs and more than half of Burroughs' disloyal customers moved to HIS equipment. These were primarily small system shifts in both cases.

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ANALYSIS OF MIXED VENDOR SITES

(Copyright 1973 -- International Data Corporation)

	1972 SAMPLE SITES					MIXED-SITE LOYALTY*		
	C	L	N	D	TOTAL	1972	1971	1970
BURROUGHS	9	22	16	5	52	.27	.04	-.92
CONTROL DATA	2	7	22	3	34	-0.50	.14	-.06
HONEYWELL/GE	2	32	38	17	89	-0.40	.10	.13
NCR	0	4	15	9	28	-1.03	.17	-.55
RCA/UNIVAC	1	19	38	44	102	-1.03	-.52	.12
OTHER	7	1	3	1	12	.83	.13	.78
NON-IBM SUBTOTAL	21	85	132	79	317	-0.51	-.11	.22
IBM	7	159	39	19	224	.43	-.15	.40
TOTAL	28	244	171	98	541	-0.12	-.12	.30

C = Crack (First time for vendor being measured into site)
L = Loyal (Upgrade or addition of equipment from vendor measured)
N = Not Loyal (Added equipment from another vendor, retained old)
D = Disloyal (Replaced equipment from vendor measured with another's)

*MIXED-SITE LOYALTY = (2C + L - N - 2D)/(C + L + N + D)

Loyalty by industry

Different organizations choose computers in different ways -- and this can have as much to do with determining loyalty or disloyalty as the user's satisfaction with his vendor(s). Non-profit institutions such as universities tend to have older, less expensive equipment . . . and often to be nuts-and-bolts oriented when selection time rolls around. Other organizations are required to accept the lowest bidder. And the exact nature of the final decision-maker can make a difference. The table (page 6) summarizes vendor loyalty by industry (on an IBM vs. non-IBM basis), and contrasts the results for 1971 and 1972.

Mixed sites: A mixed blessing?

Sites that support a number of large computers from more than one vendor are an important part of the mainframe marketplace -- because their users tend to be sophisticated big spenders. A simple measure of user loyalty at such mixed sites is hard to come by, but the formula introduced last year by EDP/IR (table, above) gives at least a point of reference.

According to this formula -- weighted to give extra credit for "cracks" into a site and extra penalty points for "toss-outs" -- all vendors except IBM and Burroughs showed a loss of mixed site loyalty during 1972. Burroughs recovered from a poor performance in 1971, cracking even more sites (in the sample) than the Industry Giant. But IBM itself bounced back from an overall loss in 1971 . . . primarily on the strength of established users who didn't move. These sites are extremely difficult to evaluate except on an individual basis. But the table does provide some basis for discussion.

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Megabyte memory for a minicomputer!

INTERDATA ENTERS "BIG MINI" MARKET . . . HOPES TO SELL THOUSANDS

When Interdata Corp. this week introduced a new line of minicomputers with "big machine architecture," it pushed into what its spokesmen call the "no-man's land" between the upper boundary of the mini world and the lower edge of midi land.

Interdata's new weapon in this explosive marketplace -- with shipments expected to quadruple to $2 billion a year by 1977, according to latest estimates by the International Data Corporation -- is the Model 7/32 . . . described as the "first 32-bit minicomputer to sell for less than $10,000." With double the word length of competitive machines, the 7/32 uses a 370-sized 24-bit address . . . and offers up to a whopping one million bytes of directly addressable, 750-nanosecond core for less than $200,000.

No paging

Data General's "Loaded" Nova 840 and DEC's Model 11/45, Interdata says, are already opening this territory, using CPUs hitched to extended memories via elaborate "memory management" hardware -- devices to overcome the built-in addressing limitations of their 16-bit word sizes. But the I 7/32 -- with the same architectural addressability of 16 megabytes that IBM is limited to on 360/370 -- eliminates complex paging and oversized operating systems.

Interdata claims its 7/32 offers OEM buyers substantial savings over Data General and DEC systems in the 64K to 256K memory range, and expects most customers to buy these sizes for initial applications. The company says its new computer is designed primarily for real-time applications such as process control.

Ease of programming

The sales pitch Interdata plans is the 7/32's easy programming -- since hardware costs, dropping fast, can't keep pace with the skyrocketing cost of software. One estimate puts programming at $10 per instruction. Interdata says it wrote the programmer's manual for the 7/32 before the hardware went to the drawing boards. As a result, the machine's high-speed microprocessors handle 147 instructions, including floating point and list processing. The basic software package includes a serial tasking system, Fortran V compiler, Basic interpreter, and text editor.

And a low-priced little brother

Along with the 7/32, Interdata is offering a new 16-bit mini -- Model 7/16 -- for users who don't need big memory. Priced at under $2,000 in quantity, the 7/16 carries the 7/32's high-speed arithmetic/logic unit as an option and can be converted to a 7/32 for $5,000 that buys three microprocessor boards. Both models are compatible with earlier Interdata minis. Deliveries of the small model begin in the first quarter of 1974, the larger one during the next quarter. Unit price of the 32-bit machine is $9,950 with 32K of memory; a more typical 256K-system has a $40,450 pricetag.

According to IDC, Interdata accounted for about 3% of minicomputer shipments in 1972. But the company has high hopes. Clearly in an optimistic mood at the introductory press conference, one Interdata official conceded that insiders talk of shipping "a couple of thousand" 7/32s next year, doubling its market share.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" OCTOBER 11,1973 • VOL.8,NO.24 P.J.McGOVERN,EDITOR

Judge Christensen changes his mind -- page 8

FINANCIAL PICTURE BRIGHTENS FOR THE COMPUTER SERVICES INDUSTRY

The computer services industry is showing encouraging signs of emerging from a rather chaotic childhood into a period of relatively stable growth and maturity. At least that's one conclusion that might be drawn from the Seventh Annual Industry Survey sponsored by ADAPSO (Association of Data Processing Service Organizations) and prepared by International Data Corp., publisher of EDP/IR.

During 1972, the ADAPSO study shows, the services industry edged into the black in a "markedly improved" services environment -- achieving an average after-taxes profit of 1.6% of the year's revenues. Profitability grew in parallel with the trend toward more specialization as service bureaus consolidate their strengths in the industries they know best.

Last year was the turning point for hundreds of small companies who began at last to see profits ... after years of slogging through red ink. The industry kept up its steady growth -- though the gold rush atmosphere of the late 1960s has died away -- and settled down to solid annual growth of 17% or 18%.

Industry balance sheets showed other -- and perhaps deeper -- signs of new health last year as well. Firms surveyed reported bigger percentages of current assets and a significant drop in long-term debts.

Meanwhile, the services industry -- with its disorienting array of tiny-to-large firms offering everything from calculations of your golf handicap to nuclear reactor simulation packages -- continued the process of defining its natural role in the data processing marketplace. Some of the trends:

- On-line processing grew faster in 1972 than any other sector of the computer industry -- despite high development costs and strong competition. But batch processing, still the mainstay with 44% of the market, remained the surest way to make money.

- As individual firms specialized, the industry as a whole widened its spectrum of services. Manufacturing and wholesale/retail customers made up two-thirds of the customer base in 1971 -- but dropped last year to less than half as "other" customers grew from 10% to a third of the total.

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TYPICAL DATA CENTER: 1972 vs. 1971

	1972	1971
Ownership	Private corporation	Private corporation
Services offered:		
applications packages	Towards on-line & packaged	Towards on-line & packaged
industry packages	Towards on-line & custom	Towards on-line & custom
No. industries served	60% served 1 to 3	55% served 1 to 3
Services most performed	Payroll & accounting/financial	Payroll & accounts receivable
Customer base:		
% within 10 miles	54%	45%
% revenue from under $5000 customers	61%	59%
% firms gaining	87%	80%
% firms losing	4%	6%
Major competition	Other service firms	Other service firms
Employees:		
% firms with 1-19 employees	55%	48%
% total work force		
Keypunchers	26%	23%
Programmers & system analysts	22%	19%
Executive managers	5%	6%
Equipment usage % of firms		
with computer(s)	97%	93%
with terminals	25%	34%
with data entry devices	63%	66%
Major problems	Labor shortage Technology Competition	Competition Image Labor shortage
Largest source of revenue	Batch processing	Batch processing
Net profit after taxes (avg. % revenues)	1.6%	-6.6%
Total industry revenues	$2.76 billion	$2.35 billion

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- The industry's 1,600 companies tended to fall more distinctly than ever into the categories of small or large -- with fewer medium-sized firms in between. An estimated 75% of the companies grossed less than $800,000 each -- and accounted for only 16% of industry revenues -- while the 10% of firms falling into the over-$2 million category took in 75% of the business.

ADAPSO polls suppliers of computer services and software each year to put together a profile of the industry ... how it fares ... where it's headed ... how individual firms measure up against the industry yardstick. This year's study focussed on small and medium-sized firms responding to the survey prepared by IDC. Responses from the small sample of large firms were factored out of the results in a few cases where they caused distortion.

Included in the study were independent suppliers of software, I/O services and computer time, as well as affiliates of computer manufacturers that mainly serve unaffiliated customers. Banks, universities, utilities and government agencies were excluded from the study.

One word of caution -- the figures in the survey were gleaned from a sample of less than 10% of the companies concerned. Results projected to cover the entire industry should be interpreted with this in mind.

The industry in profile

Every sector of the services market -- batch, on-line (interactive and remote batch), software and "other" -- saw bigger revenues in 1972, maintaining the industry's record of uninterrupted expansion. On-line processing led the way with a 30% increase. Batch processing kept pace with industry as a whole, growing 16% while its relative importance in the market continued its slow decline. From a 76% market share in 1966, batch processing has fallen to less than half -- and is expected to sink to 40% by 1975.

Software accounted for only 17% of the market last year, down from 19% in 1971 -- and should settle down to a steady 15% this year. "Other" services -- including keypunch, OCR use, computer output microfilming and training -- grew 25% in 1972 and increased their aggregate share of the market to 18%.

Where the money went

Operating expenses among the firms surveyed averaged 94% of revenues last year, a slight drop from 1971. Salaries -- the biggest budget item -- rose to 43% of revenues from an all-time low of 40% the year before. Highest wage increases went to marketing personnel, who suffered the most from cutbacks during the leaner years. Equipment spending (for items with a life of one year or less) dropped to 25% last year -- but more firms than ever -- 97% last year over 93% in 1971 -- were using their own computers.

Write-offs or capitalization of software or branch developments was reported by nearly half the companies surveyed.

Greater profitability produced more working capital for the industry in 1972, indicated by a healthy gain in current assets. Current liabilities increased only slightly, probably because of taxes on larger profits. The ratio of long term debt fell from 38% to 33% of liabilities.

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INDUSTRY PROFILE AND FORECAST
1966-1975

Total Industry	1966	1967	1968	1969	1970	1971	1972	1973	1975
Revenue ($B)	.54	.74	1.04	1.55	1.90	2.35	2.76	3.23	4.41
No. Firms	700	840	1,300	1,300	1,400	1,500	1,600	1,700	1,900
Avg. Revenue ($M)	.77	.88	.80	1.19	1.36	1.57	1.73	1.90	2.32
Sectors									
Batch Processing									
Revenue	.41	.48	.60	.74	.93	1.06	1.23	1.40	1.77
% Total	76	65	58	47	49	45	44	43	40
On-Line Processing				Remote Batch	.09	.13	.17	.22	.36
				Interactive	.24	.31	.40	.53	.83
Revenue	.02	.05	.12	.21	.33	.44	.57	.75	1.19
% Total	4	7	11	14	.17	19	21	23	27
Software									
Revenue	.10	.18	.27	.45	.44	.45	.46	.48	.65
% Total	19	24	26	29	23	19	17	15	15
Other*									
Revenue	.01	.03	.05	.15	.20	.40	.50	.60	.80
% Total	1	4	5	10	11	17	18	19	18
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	100%

* Keypunching, OCR Use, COM, Training.

Trends in services

The survey turned up several strong signs that the steady trend toward specialization and on-line processing will be the hallmark of the industry in the years just ahead. More than a quarter of all firms surveyed said they serve only one industry -- and more than half indicated they plan to specialize their services during the next few years to take advantage of expertise they gained from major customers in the past.

Accounting/financial, payroll and billing were the most widely offered services last year. The shift from batch to on-line operations in this sector is expected to accelerate over the next two years -- accompanied by a shift from custom to packaged applications. Industry packages, by contrast, will be more commonly customized for on-line use.

Customers are closer to home

The proportion of customers located within 10 miles of their service bureaus jumped from 45% to 54% in 1972 -- an indication of the industry's growing geographical density as small new firms continue to enter the ring at the rate of two a week. Most of the industry's customers are themselves small -- well over half spend less than $5000 a year on computer services.

Service companies averaged 112 customers apiece last year among those surveyed -- but 60 customers would be a more typical average among the small and medium-sized firms that made up the bulk of the sample. Nine out of 10 compan-

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ies reported a net gain in customers during 1972; only 4% reported a net loss -- an all-around improvement over the year before.

The breakdown of customers in each industry, as percentages of the total number, looked like this:

Manufacturing	24%	Insurance	5%
Wholesale/retail	24%	Education	5%
Utilities	2%	Health	4%
Banking	4%	Other	32%

Problems... competition

People were the biggest headache reported by the companies included in the survey. The limited supply of competent programmers, system analysts and sales people makes it tough to find qualified employees ... and sometimes hard to keep them once employers have invested time and money in their training.

While the competition for qualified help was stiff last year, the competition for business seemed to ease a bit. Finding and keeping customers is always a central problem, but a subjective rating of market competitiveness by the firms studied indicated the pushing and shoving isn't as hectic as it was. Over the long run, service bureaus seem to worry more about losing business to banks and the burgeoning ranks of small business computers than to each other.

In general the firms surveyed seemed to feel the industry is enjoying a better reputation for reliability these days. The industry "image," frequently mentioned in the past as an industry problem because of the poor performance of a few companies, brought few complaints this year.

(Copies of the complete ADAPSO survey and report are distributed free each year to members of the organization. Others interested in reading the in-depth report with its detailed breakdowns of the computer services industry can obtain copies from International Data Corp. at a cost of $95 each.)

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SMALL COMPUTERS ARE SWELLING THE FEDERAL GOVERNMENT'S INVENTORIES

The federal government -- by far the biggest customer of the computer industry -- publishes a detailed yearly inventory of computers owned or leased by government agencies, including those used by contractors for government work. The federal computer census lists quantities of machines classified as general purpose or dedicated application computers -- as defined by EDP/IR -- as well as special purpose computers (often tailored to military specifications) that we don't keep track of. The inventory as of June, 1972, summarized in the table on the next page, offers a few points worth noting:

- The federal government listed a total of 6,730 computers in use, up 13% from the year before. The percentage increase was exactly the same as the previous year.

- Broken down, however, the figures show only 6.7% more general purpose computers listed, while the use of minis and other computers in dedicated applications grew 19% and the population of special purpose machines (not included in the table) jumped 29%.

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COMPUTERS USED BY U.S. GOVERNMENT -- JUNE 1972

	Number of Computers					Value	
	No. Gp A	% Share	No. Gp B	No. Gp A&B	% Share	$M Gp A&B	% Share
IBM	1410	38.7	1	1411	23.3	1266	45.5
CDC	267	7.3	221	488	8.0	466	16.7
Univac/RCA	1063	29.2	-	1063	17.5	452	16.2
HIS	345	9.5	162	507	8.4	219	7.9
Burroughs	217	6.0	-	217	3.6	140	5.0
Xerox	63	1.7	307	370	6.1	106	3.8
NCR	239	6.6	-	239	3.9	25	0.9
DEC	23	0.6	904	927	15.3	40	1.4
Other	17	0.4	826	843	13.9	71	2.5
TOTALS	3644	100.0	2421	6065	100.0	2785	100.0

- The Department of Defense, with 3,700 machines, accounts for more than half the computers used by the government. The Atomic Energy Commission's phenomenal stock of computing power stands second and NASA ranks third. These three organizations account for 86% of all the computers used by the federal government.

- The overall percentage of computers owned in June, 1972, suggests a steady trend toward outright purchasing of computers by the agencies which use them. The government owns 77% of its computers, up from 73% the year before and 64% in June, 1970.

To give readers a clearer standard of comparison with commercial/industrial computer inventories, EDP/IR has reworked the government figures to show distributions -- by number and value -- of the general purpose (Group A) and dedicated application (Group B) computers in federal use. The results show how misleading a simple tabulation of quantities of computers can be in the interpretation of market shares:

- IBM supplied on 21% of all the computers reported, but accounted for 45% of the value of all the computers in the inventory.

- CDC supplied only 7% of the government base by number, but accounted for nearly 17% of the base by value.

- Univac, including its RCA machines, accounted for 22% of the total number, but claimed only about 16% of the dollars.

- DEC's share of the numbers is almost 15%, representing only 1% of the dollar base.

- The total value of the Group A and B computers used by the government as of last year was estimated at $2.785 billion by EDP/IR. The value of its highly varied and partly secret inventory of special purpose computers -- numbering 666 by government count -- is difficult to estimate and isn't included in these figures.

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CIA TAKES AIM AT ONE GIANT -- AND NERVOUSLY EYES ANOTHER

Members of the Computer Industry Association -- a lobby of 26 plug compatible, software and leasing companies who banded together during the past year to fight for "free and open competition" in the computer marketplace -- won some breathing room last month when Judge Sherman Christensen handed down his injunctions against IBM's "monopolistic" marketing practices.

But CIA -- though it claims to see IBM's "day of reckoning" at hand -- is anything but complacent these days. Less than a week after the ruling against IBM was announced, CIA spokesmen were in Washington asking Congress to double the budget of the Justice Department's anti-trust division to $25 million a year so the trust-busters can hurry along their suit to break up the industry Giant.

The association said it feels the suit -- begun in 1969 and still in the pre-trial stages -- should be speeded up, possibly with the help of a special prosecutor. It accused IBM of trying to impede progress by refusing to comply with court orders to produce documents needed by the prosecutors.

Last week CIA got unsolicited support from Judge David Edelstein -- the judge assigned to the anti-trust case -- when he prodded both parties into agreeing to submit a preliminary report on the "ultimate issues" by October 25 and scheduled a pre-trial hearing for November.

Meanwhile, CIA is keeping a close watch on proceedings in Tulsa (see box on page 8 for story). Some members of the association are worried that IBM may be able to wriggle out from under Judge Christensen's anti-monopoly injunctions unless he takes steps to nail them down tight.

One move they're anxious to forestall is IBM's plea for a three-year limit on the requirement that it publish interface specifications for new products. And their fears are understandable -- with a limit of only three years, the injunction wouldn't have many teeth left. The interface specs for the 370 line are already well known -- and IBM's next new line of computers -- referred to only as "future systems" in the trial documents -- isn't due until 1977, well after such a limit would expire.

CIA also wants to make sure the injunction specifies that IBM must publish specs when products go into production, and not merely when they're announced. Independents feel the publishing requirement won't help them much if the Giant manages to wait until just before shipments begin to tell the world what it has for sale.

And in the other corner ...

Even as IBM is being brought to bay, another "monopolist" is looming into CIA's field of view. The association called 32 computer-related manufacturers into a huddle last week to discuss AT&T's new Model 40 high speed teletype -- a low cost, high performance machine that looks suspiciously like a computer product in the eyes of competitors.

AT&T is prohibited from selling computer equipment by the FCC. But the Mod 40 is designed to handle computer communications -- and other manufacturers say they're convinced the communications giant is trying to shoulder its way into the computer market by selling the Mod 40 at close to cost ($1,165 OEM).

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THE JUDGE SAYS HE MADE A MISTAKE ...

"I have concluded that my computation of anti-trust damages against International Business Machines Corporation involves substantial error. Accordingly defendant's motion to amend finding, conclusions and judgment, or in the alternative for a new trial on the issue of damages is hereby granted. Sua sponte. Particular action in this respect will be determined at the hearing presently set for October 16, 1973, at 10 a.m. in Tulsa, OK,together with the other matters presently calendared for that date."

So ordered this day, October 8, 1973.

A. Sherman Christensen

This judicial order set off waves of speculation and misreporting when it was published last week. One point, at least, seemed clear -- it doesn't necessarily, or even probably, mean a new trial for IBM. Judge Christensen's announcement that he had miscalculated Telex's award for damages ($350 million after trebling) set off widespread speculation that he intended to reduce the award. But he may have concluded it isn't high enough. No one will actually know until October 16, when hearings on IBM's motion to change last month's ruling begin in Tulsa -- and EDP/IR will be there to get a first-hand report.

AT&T KEEPS UP THE FIGHT AGAINST "SPECIALIZED" COMMON CARRIERS

When the Federal Communications Commission made its landmark decision in 1971 allowing "specialized" common carriers such as MCI Communications Corp. and Datran to build private line business networks, it looked like the start of a boom in data communications. By concentrating high volume business communications on separate networks, independents promised to offer data transmission at much lower costs than Ma Bell was charging.

But AT&T hasn't given up the fight to keep its grip on telecommunications. Recently, in a petition to the FCC protesting the 1971 ruling, AT&T asked for a "re-evaluation" of the decision and a hearing before the public -- and claimed the proliferation of independent carriers will cost ordinary telephone users $100 million a year in increased rates by 1976.

The crux of the issue is whether the costs of all types of long distance communication should be averaged among all users -- AT&T's policy -- or if instead, competing carriers should be allowed to cream off high volume business by selling private lines -- at lower prices -- on streamlined point-to-point networks.

The FCC, in a mood to encourage competition in the telecommunications market, gave independents the go-ahead with the stipulation that they offer "specialized" services that do more than merely duplicate AT&T's efforts. But AT&T claims that such newcomers as MCI are specializing in nothing but lower prices.

AT&T will keep complaining -- but it seems a little late for the FCC to change its mind. MCI, to cite the most aggressive example, just announced plans to double the capacity of its New York-Chicago link and expects to be serving 20 U.S. cities via its new microwave network by the end of the year.

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